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(Editorial policy continued on inside back cover)

Cover Photo: Eastern Kingsnake from the City of Alexandria (see p 69).

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Contents

Cover object availability and preferences by Woodland Salamanders (Genus *Plethodon*) on surface-mined and unmined habitats in the Virginia coalfields.
Samantha Hill, Isabelle Johnson, Christian Kennedy, Isabelle Kennedy, Caleb Mullins, Megan Roark, Olivia Salazar, Kaleigh Still, and Walter H. Smith 43

Fifteenth Annual HerpBlitz: Resurvey of Mattaponi Wildlife Management Area.
Jason Gibson and Paul Sattler 57

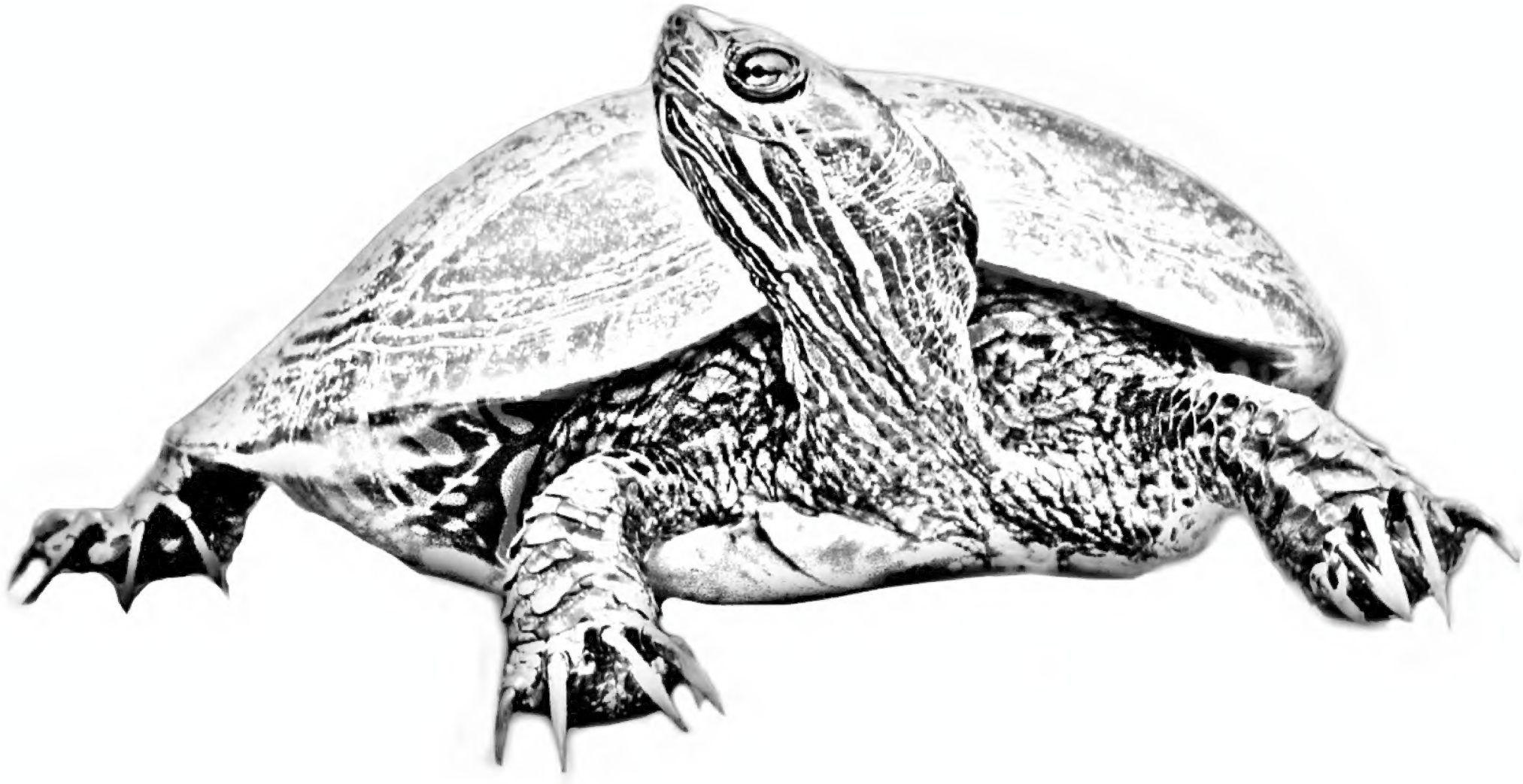
Field Notes 69

President's Corner 76

Minutes of the Fall 2021 VHS Meeting 78

Treasurer's Report 85

Catesbeiana 41(2)



John White

Cover object availability and preferences by Woodland Salamanders (Genus *Plethodon*) on surface-mined and unmined habitats in the Virginia coalfields

Samantha Hill, Isabelle Johnson, Christian Kennedy, Isabelle Kennedy, Caleb Mullins, Megan Roark, Olivia Salazar, Kaleigh Still, and Walter H. Smith*

Department of Natural Sciences, The University of Virginia's College at Wise, One College Avenue, Wise, Virginia 24293 (*Corresponding Author Email: whs2q@uvawise.edu)

Abstract

Surface coal extraction and subsequent reclamation activities significantly alter hardwood forest habitats for Appalachian plethodontid salamanders, removing forest cover and compacting soils used by plethodontids as substrate. Past work has shown that both salamander species richness and abundance are lower on many formerly mined habitats across the Appalachian Mountains than in nearby unmined forests, although questions remain about how surface mining activities alter specific microhabitat variables important to these species and drive broader patterns in richness and abundance. We sought to address these questions through a comparison of cover object availability and preferences by terrestrial plethodontids on a former surface mine complex in Wise, Virginia, encompassing unmined, reclaimed, and mined but unreclaimed habitats. We found that the size of coarse woody debris items was significantly smaller in reclaimed mined habitats, with Cumberland Plateau Salamanders (*Plethodon kentucki*) displaying non-random preferences for rock cover on formerly mined but reforested sites. While our surveys were limited in geographic scope and may only apply to the particular physiographic contexts surrounding the study region, our results show that cover object availability may drive microhabitat preferences of terrestrial plethodontids on former surface mines, providing one potential mechanism for previously observed shifts in relative abundance on mined habitats.

Keywords: Appalachia; disturbance; ecology; habitat; salamander; surface mining

Introduction

Surface mining activities exert significant influences on the structure and function of Appalachian ecosystems. Surface mining specifically alters local and regional topography (Ross et al., 2016), leads to degradation in downstream water quality (Petty et al., 2010; Bernhardt and Palmer, 2011; Lindberg et al., 2011), and fragments forest habitat for native Appalachian fauna (Wickham et al., 2007; Maigret et al., 2019), with natural forest succession and ecosystem services often interrupted on many large, unreclaimed surface mines (Zipper et al., 2011a; Avera et al., 2015). The southwest Virginia coalfields represent one of the most intensively surface-mined portions of the central Appalachian region, reflecting legacies of surface mining spanning from linear contour mines to larger mountaintop removal mines (Pericak et al., 2018).

The ecological legacies of surface mining impose substantial impacts on amphibian diversity, particularly for plethodontid salamanders that are especially diverse across the central Appalachian region. Past research, for example, has found that both aquatic (Wood and Williams, 2013a; Muncy

et al., 2014; Price et al., 2015) and terrestrial (Wood and Williams, 2013b; Williams et al., 2017) plethodontid taxa exhibit lower occupancy, richness, and abundance on mined sites when compared to unmined reference habitats. Others have found that individual species' responses to surface coal extraction are often context-dependent and are tied to specific microhabitat variables that may be impacted by mining. Hinkle et al. (2018) found that Green Salamanders (*Aneides aeneus*) in Virginia were negatively impacted by surface mining but were still able to persist in small, remnant habitat patches within larger surface mines, provided that sufficient woody vegetation cover and rock outcrop habitat was available. Wood and Williams (2013b) found increasing terrestrial salamander abundance with increasing distance into intact forests along mine edges, and Brady (2016) found that terrestrial salamanders were able to recolonize surface mines that had been allowed to naturally become reforested. While the negative impacts of surface mining on terrestrial plethodontids are clear, there is still much insight to be gained regarding how surface mining activities influence microhabitat availability for terrestrial plethodontids and how this may subsequently limit salamander abundance on former surface mines or facilitate the recovery of some salamander populations.

Surface mining activities, particularly those occurring after the passage of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), potentially alter the availability of microhabitat features in numerous ways. Overburden removal and soil compaction during the mine reclamation process increases bulk soil density and likely reduces the availability of surface rocks (Zipper et al., 2011b; Bohrer et al., 2017), potentially impacting microhabitat for some terrestrial plethodontid taxa. Similarly, the use of non-native, small-stemmed scrub/shrub vegetation during reclamation may also result in less coarse woody debris – another key salamander microhabitat component – being generated over time (Oliphant et al., 2017; Sena et al., 2020; Holmes et al., 2021). Even in cases where revegetation is performed using native hardwood tree species, it may take decades for forests to mature to a point where enough forest biomass and coarse woody debris is produced through tree damage and senescence to replace woody debris removed during the initial surface mining process (Zipper et al., 2011c; Sena et al., 2015). To date, however, little to no work has been performed to specifically assess the microhabitat characteristics of formerly mined sites within the context of the use of available cover objects by plethodontid taxa.

We addressed these knowledge gaps by performing an assessment of cover object availability and preferences by terrestrial plethodontid taxa (Genus *Plethodon*) during the summer and fall of 2020 at a formerly-mined site in Wise County, Virginia – the most heavily surface-mined county in the Virginia coalfields. Specifically, we assessed cover object (rocks, coarse woody debris) availability and preferences across three habitat categories: a pre-SMCRA surface-mined site where native hardwood forests have since recovered; a reclaimed post-SMCRA site where native hardwood forests have yet to recover; and an unmined reference site. We asked two primary questions: (i) is the number and average size of available cover objects different across mined and unmined sites, and (ii) are salamanders randomly or non-randomly using cover objects as microhabitat across mined and unmined sites?

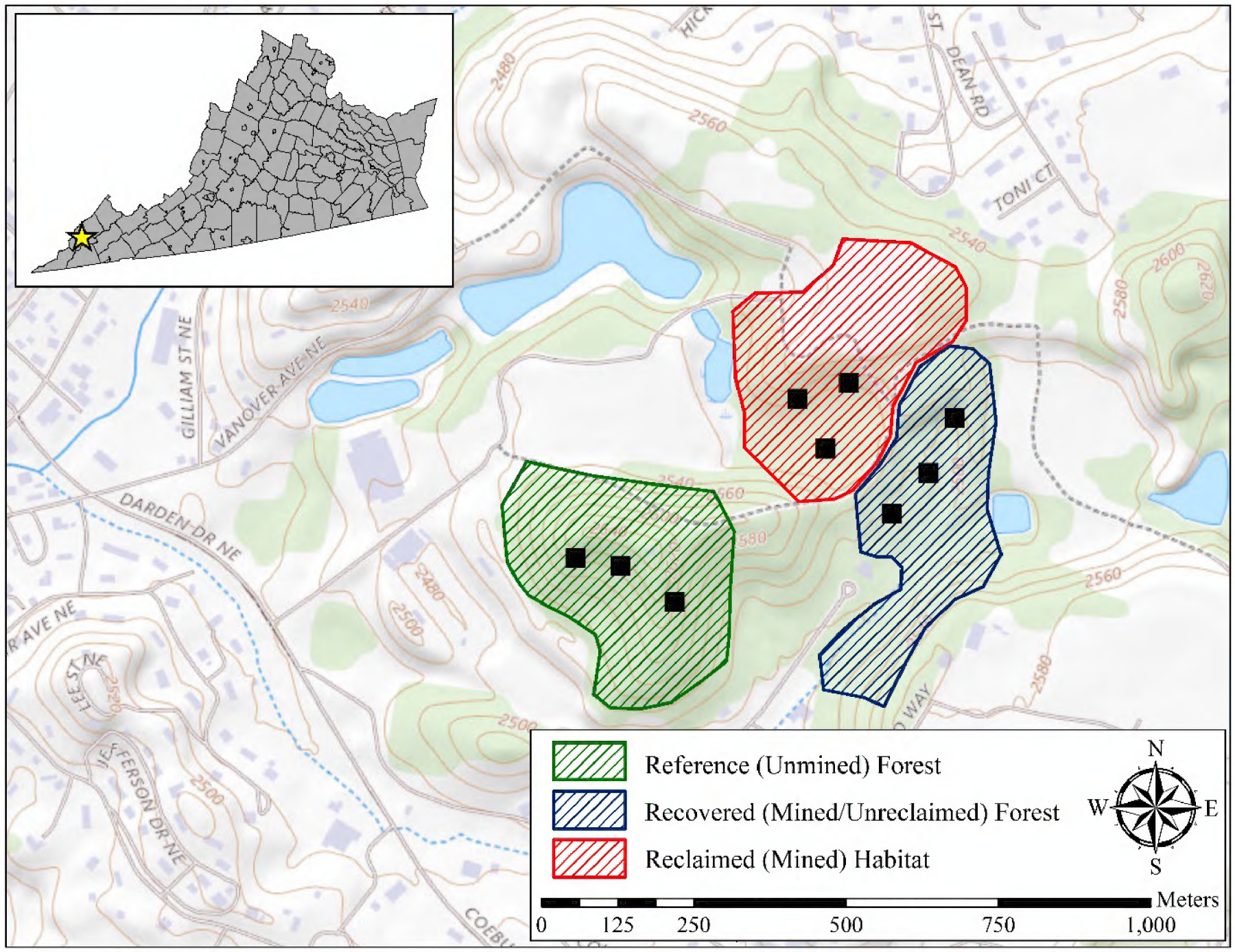


Figure 1: Location of study area and site groupings reflecting mineral extraction disturbance histories across a surface mine complex encompassing the headwaters of Yellow Creek in Wise County, Virginia. Black squares within each habitat grouping denote the location of survey plots, with the star in the inset map denoting the location of the study area within Virginia.

Study Area and Site Selection

We selected study sites from a large, 130 ha surface mine complex encompassing the headwaters of Yellow Creek in Wise, Virginia (36.9764, -82.5582; Figure 1). This site is one of the only publicly accessible former surface mines in the southwest Virginia coalfields and contains a mix of disturbed habitats reflecting varying forms of surface coal extraction. These activities include unreclaimed surface mining occurring in the early to mid-1900s prior to the passage of SMCRA and reclaimed surface mining occurring in the 1980s following the passage of SMCRA and the associated establishment of formal reclamation guidelines. The unreclaimed mines at this site have seen the reestablishment of native mixed mesophytic hardwood forests via volunteer tree establishment and succession since the cessation of mining, while reclaimed surface mines have predominantly been revegetated with planted, non-native taxa including Autumn Olive (*Eleagnus umbellata),* Eastern White Pine *(Pinus strobus),* and Sericea Lespedeza *(Lespedeza cuneata*). This site also contains several large patches of

reference forests that have not experienced surface mining activities or other forms of anthropogenic disturbance over the past 60+ years.

We sought to compare cover object availability and use by the immediate study area's two most common and abundant terrestrial plethodontid salamanders, Cumberland Plateau Salamanders (*Plethodon kentucki*) and Southern Ravine Salamanders (*Plethodon richmondi*). We specifically surveyed plots within three site groupings at this former surface mine complex: (i) older, unreclaimed habitats characterized by native forest reestablishment after mining (hereafter "Recovered" sites), (ii) more recent, reclaimed habitats characterized by planted, non-native vegetation (hereafter "Reclaimed" sites), and (iii) unmined forest patches as a rough control (hereafter "Reference" sites). We established three 20m x 20m ($400m^2$) plots in each of the three aforementioned habitat groupings for the purposes of cover object and salamander sampling. We placed plots randomly within each of these habitat types, with the constraint that plots were placed at least 50m from the edge of each habitat type to minimize edge effects from adjacent habitat patches. Plots were also spaced a minimum of 30m apart within each habitat type to minimize the possibility of encountering the same animals within multiple plots.

We first characterized the physical habitat structure within each plot. At each site, we measured the following: slope (using a Suunto clinometer), aspect (degrees azimuth), percent canopy cover (using a spherical densiometer), and basal area (using a Jim-Gem 10 BAF rectangular cruising prism). All measurements were taken from the centroid of each plot. All plots across all habitat types were in midslope positions at similar elevations (approximately 790 m asl) and aspect (south to west-southwest; 150 to 250 degrees azimuth).

Salamander Surveys

We surveyed all available cover objects (rocks, coarse woody debris) within each plot for salamanders on weekly intervals from 1 August to 1 December 2020. This survey period was chosen to overlap with increased local surface activity among the target species following the decline of peak summer temperatures. The survey end date was selected due to the onset of colder winter conditions and the observed end of the local active season for resident terrestrial plethodontid taxa. We performed diurnal surveys due to nocturnal access restrictions at the study site, with survey times structured randomly within the constraints of site access to avoid sampling bias. Surveys consisted of lifting each cover object within each plot and searching visually for salamanders. Objects smaller than 5 cm (reflecting the general size of salamanders typically encountered in the study region) and large, embedded rocks that could not be lifted without excavating topsoil were not searched or counted. Encountered salamanders were identified to species and placed back beneath each cover object at the point of capture, with cover objects replaced as close to their original positioning as possible to minimize habitat disturbance from sampling activities during future surveys.

Cover objects with salamanders present were surveyed for their physical dimensions. These included the a, b, and c axes for rock cover and length and maximum diameter for coarse woody debris. We did not mark encountered salamanders to assess later recaptures since the focus of our study was on cover object preferences rather than salamander abundance. As a result, it is possible that we encountered the same

animals underneath multiple cover objects during separate survey dates within some plots. However, we did not count instances where conspecifics were found under the same cover object on multiple survey occasions as independent cover objects in subsequent statistical analyses to avoid falsely inflating counts of occupied cover objects.

Cover Object Assessments and Statistical Analysis

Following the completion of organismal surveys, we inventoried and measured all surface cover objects within each plot at each site, regardless of salamander presence. Specifically, we inventoried the number of surface rocks and coarse woody debris within each plot, measuring the size of each inventoried cover object. Objects smaller than 5 cm and large, embedded rocks that could not be lifted without excavating topsoil were again excluded from these assessments. We again measured the a, b and c axes of all rocks and the length and maximum diameter of all coarse woody debris. We then estimated the volume of each cover object using the aforementioned dimensions. Cover objects were replaced as initially found at the completion of exhaustive plot assessments.

Following data collection, we sought to determine if the mean size (volume) of rocks and coarse woody debris varied between site groupings. We used a nonparametric Kruskal-Wallis Test to compare mean rock and coarse woody debris size across site groupings for all cover objects, regardless of salamander presence, repeating these comparisons for the size of just those rocks and coarse woody debris where we encountered salamanders. Since this resulted in multiple comparisons being performed on the same dataset, we used Bonferroni-adjusted significance values to account for the influence of multiple comparisons. All statistical analyses were performed using R (http://www.r-project.org).

We also sought to test if salamanders used cover objects of a given type (rocks, coarse woody debris) non-randomly and at different frequencies from the actual frequencies of available cover objects at a given site. We followed the methodology previously used by Richmond and Trombulak (2009) and Caruso (2016) to assess preferences for cover object type, using a Chi-Square Test to determine if the proportions of salamanders observed under each cover object type within each site grouping were different from what would be expected in that site grouping under the null hypothesis of random distribution. We determined expected frequencies based on overall proportions of rocks and coarse woody debris recorded within each site grouping. In cases where expected frequencies were too small (<5) to accurately perform a Chi-Square Test, we used a Fisher's Exact Test to compare observed and expected frequencies. We examined cover object preferences for data pooled across all species, as well as for Cumberland Plateau Salamanders and Southern Ravine Salamanders separately. We did not perform comparisons for the reclaimed site grouping due to a low overall number of cover objects of any type with a salamander occupant (n = 4) encountered within this site.

Table 1: Physical habitat characteristics across three site groupings (unreclaimed mineland ("Recovered"), reclaimed mineland ("Reclaimed"), and unmined reference forest ("Reference")) across the headwaters of Yellow Creek in Wise, Virginia. Values for each habitat variable reflect means ± 1 SD across all plots within each site grouping.

Site	Canopy Cover (%)	Aspect (azimuth)	Slope (degrees)	Basal Area (m^2/ha)
Recovered	96.9 ± 0.86	148 ± 9.2	16.3 ± 2.4	60 ± 13.4
Reclaimed	93.4 ± 4.7	250 ± 34.9	12.7 ± 2.4	33.3 ± 14.2
Reference	100.0 ± 0	218.3 ± 17.5	15 ± 1.6	113.3 ± 14.3

Results

There were substantial habitat differences across plot groupings. Despite being located at similar aspects and elevation, this reflects each site's legacy of surface mining and associated habitat disturbance (Figure 2). These differences were most pronounced between the reclaimed site and the recovered/reference sites (Table 1), with reclaimed sites possessing lower and more variable canopy cover and less basal area than both recovered and reference sites. Slope was also slightly lower on reclaimed sites, which had been heavily graded during the reclamation process. By contrast, reclaimed and reference sites possessed relatively similar habitat characteristics, despite their differences in mining land use legacies.

Figure 2: Habitat conditions within the study area at (A) unmined reference habitat, (B) formerly surface-mined and unreclaimed habitat that has become reforested through volunteer hardwood establishment, and (C) formerly surface-mined and reclaimed habitat that has been planted with predominantly non-native scrub/shrub vegetation.

Similarly, we found variable counts of potential cover objects across the three site classifications (Table 2), with more rocks and coarse woody debris within the reference site compared to the recovered site. The reclaimed site contained dramatically fewer rocks and coarse woody debris compared to both other site groupings. We found no significant difference in the mean size of surface rocks across the three types of sites ($\chi^2 = 5.38$, df = 2, p = 0.14). We did, however, find a significant difference in the size of coarse woody debris across site groupings ($\chi^2 = 7.46$, df = 2, p = 0.04), with coarse woody debris items being significantly smaller on the reclaimed site compared to reference and recovered sites (Figure 3). We did not find a significant difference between the mean size of both surface rocks ($\chi^2 = 0.12$, df = 1, p = 0.73) and coarse woody debris ($\chi^2 = 1.70$, df = 1, p = 0.38) where terrestrial salamanders were found to be present between types of sites.

Table 2: Total counts of potential cover rocks, coarse woody debris (CWD), and woodland salamander species encountered for three site groupings (unreclaimed mineland ("Recovered"), reclaimed mineland ("Reclaimed"), and unmined reference forest ("Reference")) across the headwaters of Yellow Creek in Wise, Virginia during surveys in 2020. Habitat type (rocks, CWD) next to each species' name reflects the number of cover objects with each salamander species found beneath them in a given site grouping across all survey visits.

Site	Rock Count	*Plethodon kentucki* (Rocks)	*Plethodon richmondi* (Rocks)	CWD Count	*Plethodon kentucki* (CWD)	*Plethodon richmondi* (CWD)
Recovered	19	14	3	20	5	2
Reclaimed	9	2	0	4	0	2
Reference	51	16	6	29	4	6

We encountered 60 cover objects occupied by salamanders across all plots, including 41 cover objects occupied by Cumberland Plateau Salamanders and 19 cover objects occupied by Southern Ravine Salamanders (Table 2). We encountered more cover objects with salamander occupants at the reference site, although estimating the true abundance of each species within each site classification was beyond the scope of our study due to our methodological approach. We also encountered small numbers of other salamander species that were not the focus of this study, including six Four-Toed Salamanders (*Hemidactylium scutatum*), two Northern Slimy Salamanders (*Plethodon glutinosus*), one Southern Two-Lined Salamander (*Eurycea cirrigera*), and 15 Red-Spotted Newts (*Notophthalmus viridescens*; juvenile "red eft" stage). Individuals of the latter species were all actively moving throughout plots during surveys and were not located beneath cover objects. We assigned all encountered Cumberland Plateau Salamanders to this species based on the presence of a lighter chin and throat color than is present in Northern Slimy Salamanders (*Plethodon glutinosus*), which

are also found in the general region surrounding the study area. While we only encountered two individuals clearly possessing the darker throat coloration and spotting pattern of Northern Slimy Salamanders at the study site, we cannot rule out that some encountered individuals may have been hybrids between this species and the Cumberland Plateau Salamander. However, we excluded the aforementioned individuals clearly possessing characters that are diagnostic for Northern Slimy Salamanders from subsequent analyses to avoid conflating data from these two species.

When data from both focal *Plethodon* species were pooled, we found no evidence of non-random preferences for rock or wood cover objects at the unmined reference site (χ^2 = 0.35, df = 1, p = 0.56). Salamanders did, however, exhibit non-random cover object preferences at the recovered site (χ^2 = 4.68, df = 1, p = 0.03), specifically showing a non-random preference for rock cover. Separating data out by species further clarified this pattern. Neither Cumberland Plateau (χ^2 = 2.29, df = 1, p = 0.13) nor Southern Ravine Salamanders (χ^2 = 1.36, df = 1, p = 0.24) displayed non-random preferences for cover object types at the reference site. Within the recovered site, Cumberland Plateau Salamanders did display a non-random preference for rock cover (χ^2 = 4.75, df = 1, p = 0.03) while Southern Ravine Salamanders did not (Fisher's Exact Test; p = 0.90), indicating that the former species was driving the patterns noted for the recovered site in our overall, pooled dataset.

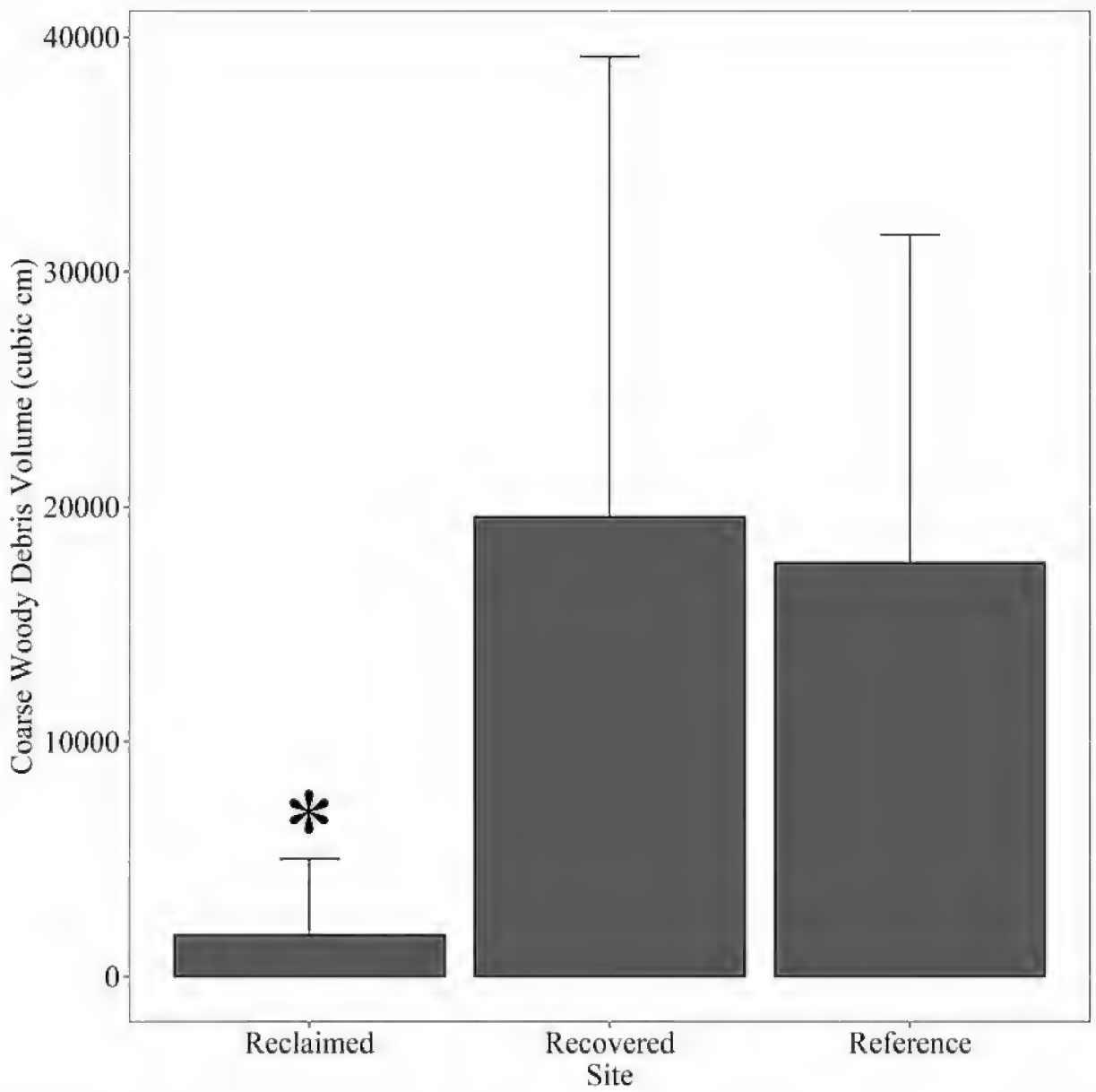


Figure 3: Coarse woody debris sizes (mean ± 1SD) across three site groupings (unreclaimed mineland ("Recovered"), reclaimed mineland ("Reclaimed"), and unmined reference forest ("Reference")) at a surface mine complex encompassing the headwaters of Yellow Creek in Wise County, Virginia. Asterisk denotes significance at $\alpha = 0.05$.

Discussion

Surface mining activities exert both immediate and long-term influences on the structure and function of Appalachian ecosystems. Alterations to surface topography and the removal of forest cover during the mining process remove native habitats for many wildlife species, leading to decreased abundances during and immediately after mining and the spatial fragmentation of populations at the landscape scale (Wickham et al., 2006; Avera et al., 2015; Maigret et al., 2019). Reclamation practices, including soil compaction during regrading and the establishment of invasive plant taxa, also result in altered successional dynamics that place forest habitats and their resident wildlife species on altered ecological trajectories that can extend for decades following mining activity (Zipper et al., 2011a; Zipper et al., 2011b; Holmes et al., 2021). Cumulatively, these impacts can result in lowered relative abundances of both aquatic and terrestrial salamanders on formerly mined sites and remove embedded habitat features that are critical for plethodontid habitat specialists (Muncy et al., 2014; Williams et al., 2017; Hinkle et al., 2018).

Our results extend the known impacts of surface mining legacies on terrestrial plethodontid salamanders to cover object availability and resulting salamander preferences for particular microhabitats. Specifically, we found that coarse woody debris (CWD) cover was substantially diminished on a reclaimed, post-SMCRA site primarily dominated by non-native plant taxa, relative to an older, unreclaimed pre-SMCRA site and a nearby unmined reference site. The scarcity and small size of CWD on the more recently mined, reclaimed site is not surprising due to both the young age of the forest on this site and the widespread planting of non-native taxa during the revegetation process. CWD generation is a long-term process that requires both mature and senescing trees (Sturtevant et al., 1997; Spetich et al., 1999), both of which are absent in the decades immediately following surface mineral extraction. Similarly, non-native shrub species such as Autumn Olive, which dominate this site, are smaller-diameter species than most native Appalachian hardwoods, which should lead to fewer larger pieces of CWD being generated over time. Comparisons between the reclaimed mine site and nearby reference and recovered sites mirrored these expectations, with less CWD availability occurring following mining and reclamation and smaller CWD items being present on the forest floor.

By contrast, relatively similar characteristics in CWD availability between the older, unreclaimed surface mine and nearby reference site were somewhat more surprising. While a native hardwood forest has naturally regenerated at this mined site, this forest is at least several decades younger than forests at the unmined reference site. The forest at this site has also yet to fully mature into the typical hardwood forest structure seen in the surrounding region, which contains a thick overstory shading a complex arrangement of midstory and understory species such as *Rhododendron maximum* and herbaceous flowering plants (Crozier and Boerner, 1984; McEwan et al., 2005). These differences would lead one to expect that CWD availability and size may be somewhat diminished even in such recovered sites following mining, although our data indicate that even younger forests may generate similar CWD characteristics on formerly mined sites where native hardwood re-establishment is encouraged. Our results also match recently published work

supporting hardwood restoration techniques on former mines as a way to move such sites towards an ecological trajectory that more closely matches that of unmined sites (Angel et al., 2009; Zipper et al., 2011a).

Depsite this lack of a difference in cover object availability between the reference and reforested, mined site, we did detect a significant shift in cover object preferences between these sites among plethodontids that are common and abundant in regional hardwood forests. Past work on cover object preferences in congeners of our focal species has found a preference for rocks as cover objects (Richmond and Trombulak, 2009), similar to this study's findings at the recovered site. To our knowledge, however, our results form the first confirmation of altered cover object preferences in Appalachian plethodontid taxa on formerly mined sites, relative to nearby unmined forests. Specifically, we found a shift towards rock cover in Cumberland Plateau Salamanders on the older mined site, despite a general lack of overall structural differences in rock and CWD cover between this site and the nearby reference forest.

The mechanisms underlying a preference for surface rocks by salamanders at the recovered site are not clear from our dataset, although the microclimatic characteristics of cover objects may form one possible explanation. Previous work has suggested that cover object selection in terrestrial salamanders is a function of the ability for cover objects to modulate soil temperatures (Mathis, 1990), maintain adequate soil moisture (Keen, 1984), and/or harbor higher invertebrate prey densities (Fraser, 1976). While we did not measure temperature and soil moisture beneath cover objects in our study, it is plausible that compacted soils and differing soil profiles on formerly mined sites may lead to altered microclimatic characteristics beneath cover objects. These differences, coupled with structural differences in surrounding forests that alter canopy cover and associated shading, may lead to larger, more dense cover objects like surface rocks being preferable for salamanders within formerly mined forests.

Similarly, CWD deposited on the forest floor at different times and from differing tree species may exhibit variable decompositional stages that may influence individual CWD items' suitability as salamander microhabitat (Richmond and Trombulak, 2009). We did not notice substantial qualitative differences in the decompositional stages of CWD between reference and mined sites, but future work quantitatively assessing the decompositional status of CWD items (e.g., physical breakdown, moisture content) may shed further light on the roles of CWD in younger, mined habitats. Collectively investigating the role of these more physiologically relevant variables in cover object selection among plethodontids occupying mined habitats is one possible avenue for future investigation stemming from our results.

Nevertheless, our data indicate that the legacies of surface mining on Appalachian salamanders persist well after mining has ceased and vegetative recovery has progressed on former mines. Past work has found similar results, with decreased species richness and relative abundances of salamanders on formerly mined sites (Wood and Williams, 2013b; Muncy et al., 2014; Williams et al., 2017). Our results highlight the potential role of altered cover object preferences in shaping these differences in abundance on formerly mined sites. While we did not perform capture-mark-recapture or other approaches to estimate abundance in our study, it is possible that altered cover object preferences may limit the abundance

of some salamander taxa on sites that have experienced surface mining, particularly when preferred cover objects are in limited supply. Since data were collected from a relatively small surface mine in one corner of the Appalachian coalfields, we are cautious about extrapolating our results more broadly to other coal-bearing regions with differing climatic, geological, and physiographic characteristics from the southwest Virginia coalfields. Within the immediate study region, however, cover object preferences and availability may form one potential mechanism driving past observations of altered salamander abundance on formerly mined sites.

More broadly, our results underscore that the assessment of ecosystem recovery following surface mining should not be based on the structural attributes of a site or its habitat alone. While the reference site and reforested mined site did not exhibit significant differences in CWD and rock availability or size, for example, we nonetheless detected significantly different microhabitat preferences between these sites for resident salamander taxa. Other work has similarly stressed the need to restore the functional attributes of post-mining habitats in Appalachia (Northington et al., 2011; Evans et al., 2013), and our results extend these needs to understanding the microhabitat selection of plethodontid salamanders – a key functional component of Appalachian forest ecosystems (Davic and Welsh, 2004). Further disentangling these differences between mined and unmined sites, as well as exploring if and how approaches like artificial cover object placement may supplement available microhabitat on recovering surface mines, will be necessary to fully understand and effectively manage the impacts of mining on plethodontid salamander taxa throughout the Appalachian coalfields.

Literature Cited

Angel, P.N., Burger, J.A., Davis, V.M., Barton, C.D., Bower, M., Eggerud, S.D. & Rothman, P. 2009. The forestry reclamation approach and the measure of its success in Appalachia. American Society of Mining and Reclamation 2009(1): 18-36.

Avera, B.N., Strah, B.D., Burger, J.A, & Zipper, C.E. 2015. Development of ecosystem structure and function on reforested surface-mined lands in the Central Appalachian Coal Basin of the United States. New Forests 46(5): 683-702.

Bernhardt, E.S., & Palmer, M.A. 2011. The environmental costs of mountaintop mining valley fill operations for aquatic ecosystems of the Central Appalachians. Annals of the New York Academy of Sciences 1223(1): 39-57.

Bohrer, S.L., Limb, R.F., Daigh, A.L.M., & Volk, J.M. 2017. Belowground attributes of reclaimed surface mine lands over a 40-year chronosequence. Land Degradation and Development 28(7): 2290-2297.

Brady, J.K. 2016. Salamander diversity of reforested abandoned surface coal mines in the Appalachian Region, U.S.A. Restoration Ecology 24(3): 398-405.

Caruso, N.M. 2016. Surface Retreats Used among Four Genera of Terrestrial Salamanders in the Great Smoky Mountains National Park. Journal of Herpetology 50(1): 87-93.

Crozier, C.R., & Boerner, R.E.J. 1984. Correlations of understory herb distribution patterns with microhabitats under different tree species in a mixed mesophytic forest. Oecologica 62(3): 337-343.

Davic, R.D., & Welsh, H.H. 2004. On the Ecological Roles of Salamanders. Annual Review of Ecology, Evolution, and Systematics 35(2004): 405-434.

Evans, D.M., Zipper, C.E., Burger, J.A., Strahm, B.D., & Villamagna, A.M. 2013. Reforestation practice for enhancement of ecosystem services on a compacted surface mine: Path toward ecosystem recovery. Ecological Engineering 51(2013): 16-23.

Fraser, D.F. 1976. Empirical evaluation of the hypothesis of food competition in salamanders of the genus Plethodon. Ecology 57(3): 238–251.

Hinkle, M.P., Gardner, L.A., White, E., Smith, W.H., & VanGundy, R.D. 2018. Remnant Habitat Patches Support Green Salamanders (*Aneides aeneus*) on Active and Former Appalachian Surface Mines. Herpetological Conservation and Biology 13(3): 634-641.

Holmes, M.A., Whitacre, J.V., Bennion, L.D., Poteet, J., & Kuebbing, S.E. 2021. Land-use history and abiotic gradients drive abundance of non-native shrubs in Appalachian second-growth forests with histories of mining, agriculture, and logging. Forest Ecology and Management 494(2021): 119296.

Keen, W.H. 1984. Influence of moisture on the activity of a plethodontid salamander. Copeia 1984(1): 684–688.

Lindberg, T.T., Bernhardt, E.S., Bier, R., Helton, A.M., Merola, R.B., Vengosh, A., & Di Giulio, R.T. 2011. Cumulative impacts of mountaintop mining on an Appalachian watershed. Proceedings of the National Academy of Sciences 108(52): 20929-20934.

McEwan, R.W., Paratley, R.D., Muller, R.N., & Riccardi, C.L. 2005. The vascular flora of an old-growth mixed mesophytic forest in southeastern Kentucky. Journal of the Torrey Botanical Society 132(4): 618-627.

Maigret, T.A., Cox, J.J., & Yang, J. 2019. Persistent geophysical effects of mining threaten ridgetop biota of Appalachian forests. Frontiers in Ecology and the Environment 17(2): 85-91.

Mathis, A. 1990. Territoriality in a terrestrial salamander: The influence of resource quality and body size. Behaviour 112(3): 162–175.

Muncy, B.L., Price, S.J., Bonner, S.J., & Barton, C.D. 2014. Mountaintop removal mining reduces stream salamander occupancy and richness in southeastern Kentucky (USA). Biological Conservation 180(2014): 115-121.

Northington, R.M., Benfield, E.F., Schoenholtz, S.H., Timpano, A.J., Webster, J.R., & Zipper, C. 2011. An assessment of structural attributes and ecosystem function in restored Virginia coalfield streams. Hydrobiologia 671(1): 51-63.

Oliphant, A.J., Wayne, R.H., Zipper, C.E., Ford, W.M., Donovan, P.F., & Li, J. 2017. Influence of spoil type on afforestation success and natural vegetative recolonization on a surface coal mine in Appalachia, United States. Restoration Ecology 23(2): 131-138.

Pericak, A.A., Thomas, C.J., Kroodsma, D.A., Wasson, M.F., Ross, M.R.V., Clinton, N.E., Campagna, D.J., Franklin, Y., Bernhardt, E.S., & Amos, J.F. 2018. Mapping the yearly extent of surface coal mining in Central Appalachia using Landsat and Google Earth Engine. PLoS ONE 13(7): e0197758.

Petty, J.T., Fulton, J.B., Strager, M.P., Merovich, G.T., Stiles, J.M., & Ziemkiewicz, P.F. 2010. Landscape indicators and thresholds of stream ecological impairment in an intensively mined Appalachian watershed. Freshwater Science 29(4): 1292-1309.

Price, S.J., Muncy, B.L., Bonner, S.J., Drayer, A.N., & Barton, C.D. 2015. Effects of mountaintop removal mining and valley filling on the occupancy and abundance of stream salamanders. Journal of Applied Ecology 53(2): 459-468.

Richmond, L.S., & Trombulak, S.C. 2009. Distribution of Red-backed Salamander (*Plethodon cinereus*) with Respect to Cover-object Characteristics in the Green Mountains of Vermont. Northeastern Naturalist 16(1): 13-26.

Ross, M.R.V., McGlynn, B.L., & Bernhardt, E.S. 2016. Deep Impact: Effects of Mountaintop Mining on Surface Topography, Bedrock Structure, and Downstream Waters. Environmental Science and Technology 50(4): 2064-2074.

Sena, K., Barton, C., Hall, S., Angel, P., Agouridis, C., & Warner, R. 2015. Influence of spoil type on afforestation success and natural vegetative recolonization on a surface coal mine in Appalachia, United States. Restoration Ecology 23(2): 131-138.

Sena, K., Franklin, J.A., Swab, R.M., & Hall, S.L. 2020. Plant Communities on Appalachian Mined Lands. In C.E. Zipper & J. Skousen (Eds.), Appalachia's Coal-Mined Landscapes: Resources and Communities in a New Energy Era (pp. 111-134). Springer.

Spetich, M.A., Shifley, S.R., & Parker, G.R. 1999. Regional Distribution and Dynamics of Coarse Woody Debris in Midwestern Old-Growth Forests. Forest Science, 45: 302-313.

Sturtevant, B.R., Bissonette, J.A., Long, J.N., & Roberts, D.W. 1997. Coarse woody debris as a function of age, stand structure, and disturbance in boreal Newfoundland. Ecological Applications 7(2): 702-712.

Wickham, J.D., Ritters, K.H., Wade, T.G., Coan, M., & Homer, C. 2007. The effect of Appalachian mountaintop mining on interior forest. Landscape Ecology 22(2): 179-187.

Williams, J.M., Brown, D.J, & Wood, P.B. 2017. Responses of Terrestrial Herpetofauna to Persistent, Novel Ecosystems Resulting from Mountaintop Removal Mining. Journal of Fish and Wildlife Management 8(2): 387-400.

Wood, P.B., & Williams, J.M. 2013a. Impact of Valley Fills on Streamside Salamanders in Southern West Virginia. *Journal of Herpetology* 47(1): 119-125.

Wood, P.B., & Williams, J.M. 2013b. Terrestrial salamander abundance on reclaimed mountaintop removal mines. Wildlife Society Bulletin 37(4): 815-823.

Zipper, C.E., Burger, J.A., Skousen, J.G., Angel, P.N., Barton, C.D., Davis, V., & Franklin, J.A. 2011a. Restoring Forests and Associated Ecosystem Services on Appalachian Coal Surface Mines. Environmental Management 47(5): 751-765.

Zipper, C.E., Burger, J.A., McGrath, J.M., Rodrigue, J.A., & Holtzman, G.I. 2011b. Forest Restoration Potentials of Coal-Mined Lands in the Eastern United States. Journal of Environmental Quality 40(5): 1567-1577.

Zipper, C., Evans, D.M., Burger, J., & Fields-Johnson, C. 2011c. Woody biomass production on post-SMCRA mined lands over three years and comparisons with other studies. Journal of the American Society of Mining and Reclamation 2011(1): 768-786.

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Fifteenth Annual HerpBlitz: Resurvey of Mattaponi Wildlife Management Area

Jason D. Gibson[1] and Paul W. Sattler[2]

[1] Patrick and Henry Community College, Biology Department, Martinsville, Virginia 24112
[2] Department of Biology, Liberty University, Lynchburg, Virginia 24515

Abstract: Mattaponi Wildlife Management Area in Caroline County, Virginia was surveyed for amphibians and reptiles on 11-13 June 2021. A total of 24 species (11 anurans, 3 salamanders, 4 turtles, 3 lizards, and 3 snakes) were observed during the survey. Three of the species are listed in Virginia's 2015 Wildlife Action Plan as species with special conservation needs; *Lithobates virgatipes* (Tier IIIa), *Scaphiopus holbrookii* (Tier IVc), and *Terrapene c. carolina* (Tier IIIa).

Keywords: Herpetological survey, Mattaponi Wildlife Management Area, *Lithobates virgatipes*, Caroline County

Introduction

The Virginia Herpetological Society HerpBlitz was started in 2006 as an effort to increase our knowledge of the distribution and ecology of reptiles and amphibians in Virginia. At the initial conception of this survey it was hoped that after 10 years some HerpBlitz sites would be revisited to see if there was any change in the number of animals and species found. The 2021 survey of Mattaponi Wildlife Management Area (WMA) is the first HerpBlitz site to be revisited. This site was the location of the 2012 HerpBlitz. Though only 9 years after the first survey of this WMA, the manager in early 2021 invited the VHS to resurvey to see what affect prescribed burning was having on amphibians and reptiles.

Mattaponi WMA is 1029 hectares in the Coastal Plain. There are a variety of habitats with mature upland hardwood and mixed forests, vernal pools, riparian areas along the Mattaponi River, clearcut areas, and wetlands consisting of shallow oxbow lakes. Watson (2013) in 2012 found 26 species including 11 amphibians and 15 reptiles. Since the time of her survey report the manager of the property has conducted extensive prescribed burns on significant parts of the WMA. Prescribed burns were conducted in 2015, 2017, 2019, and 2021. Burning occurred in cutovers and in thinned pine forests. In the past most eastern Virginia forests were fire controlled either by Native Americans or from lightning strikes, so the return of fire to this area helps to reestablish earlier influences to the ecology (Abrams, 1992). Land managers are eager to gather data to see how fire introduction is influencing the abundance and diversity of species.

Study Sites

Site 1

This survey site had no equivalent to the sites surveyed by the VHS in the 2012 HerpBlitz

of Mattaponi WMA. This area was south of the logging road on the southern part of the WMA property. The area consisted of deciduous forest which continued to the bank of the Mattaponi River. Within the forest was one small stream and several large vernal pools.

Site 2 (Site 6B in Watson, 2012)
This survey site was in the southern portion of the WMA, along the road next to oxbow lakes and the surrounding forests of pines and mixed hardwoods.

Site 3 (Site 3 in Watson, 2012)
This survey site was in the northwest portion of the WMA, accessed by the westernmost entrance. The site consisted mostly of mixed hardwoods with some pine forest and some wetlands.

Site 4 (Site 5 in Watson 2012)
This survey site was in the northeastern portion of the WMA, accessed by an entrance and parking area from Paige Road. The site consisted mostly of pine forest with a large beaver pond wetland.

Site 5 (Site 6A in Watson)
This survey site is in the southern portion of the WMA, along a main gravel road running from the largest parking area. The road parallels the Mattaponi River and is forested on the river side, and has been clearcut and maintained by fire on the opposite (western) side.

Materials and Methods

On days of 12 and 13 June and nights of 11 and 12 June, 2021 the Virginia Herpetological Society conducted the fifteenth annual HerpBlitz at Mattaponi Wildlife Management Area. In all, 20 participants volunteered during the survey period. On the morning of 12 June all survey participants cleaned footwear and equipment with a bleach solution. On Saturday two equal groups of participants were created and were sent to two different survey sites. Only one survey group was created on Sunday morning. Animals were observed or captured using the following techniques: overturning and replacing cover objects (logs, rocks, bark, and trash), visual encounters, hand capture, listening for calling anurans, and dipnetting. We also used baited hoop turtle traps, minnow traps, and chimney crayfish traps placed in several streams, a man-made drainage canal, and two oxbow lakes. All animals hand captured were visually inspected for disease, malformations, or injuries and were photographed and replaced at the original site of capture. Any measurements recorded were taken with digital calipers and a digital gram scale. Data sheets were used to record site locations, species captured, the number of animals captured, microhabitats, and other usual observations. The data sheets were deposited in the VHS Archive. Table 1 gives a summary of the effort and time spent at each site.

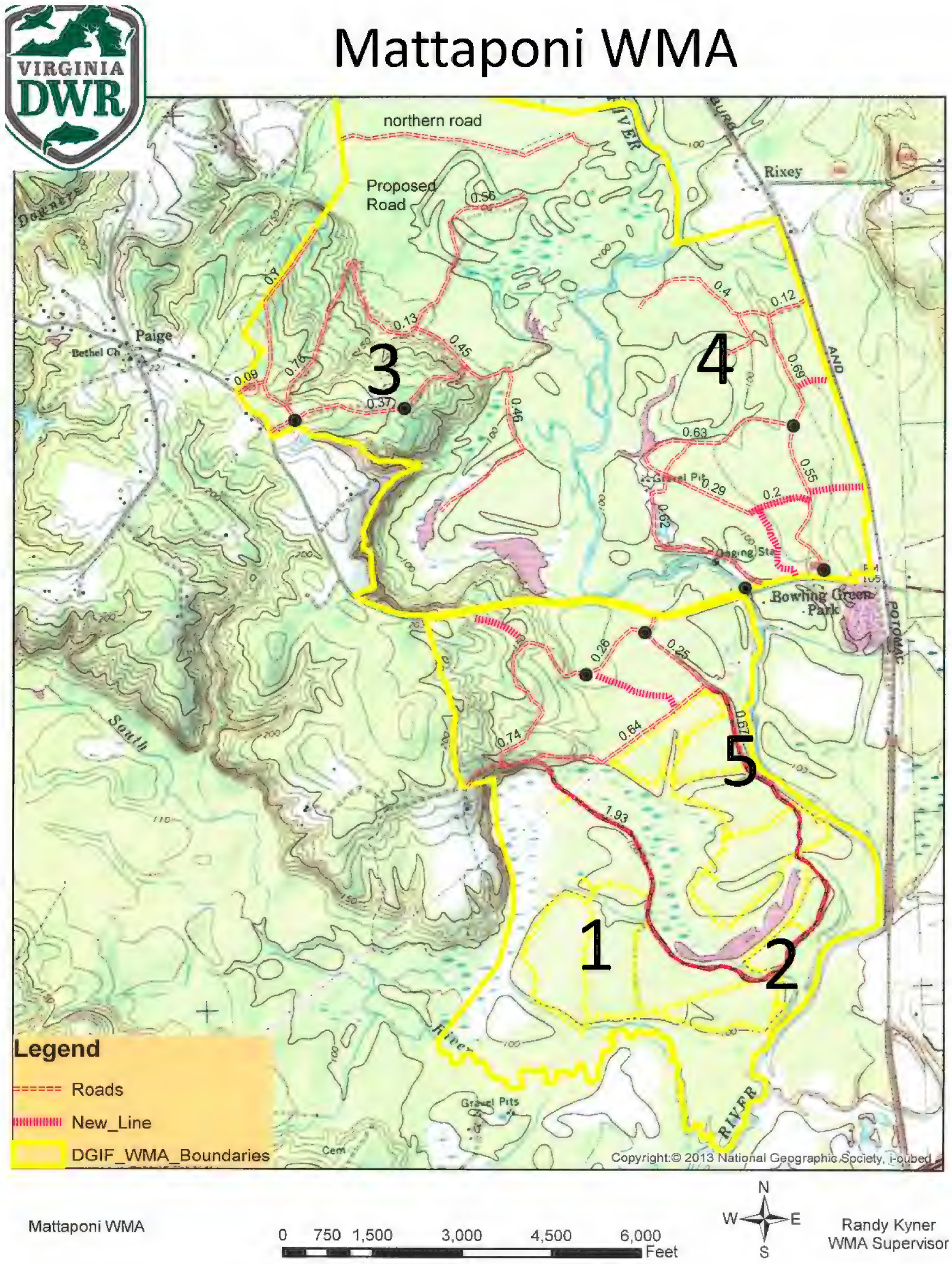

Figure 1. Map of Mattaponi WMA with survey sites indicated.

Table 1: The amount of survey effort per research site.

	Site 1	Site 2	Site 2[a]	Site 2[b]	Site 3	Site 4	Site 4[a]	Site 4[b]	Site 5
Number of surveyors	10	7	2	4	15	8	2	4	8
Hours surveyed	2	2.5	1	1.5	2	1.5	1	1	1
Person hours of survey effort	20	17.5	2	6	30	12	2	4	8

2[a] and 4[a] were night hikes on 11 June 2021. 2b and 4b were night hikes on 12 June 2021.

Results

At the conclusion of this survey 24 species were observed (11 anurans, 3 salamanders, 4 turtles, 3 lizards, and 3 snakes) with a total of 169 animals captured and identified. Two predated turtle nests were found at site 2. The nests were found to have 12 and 18 eggs respectively. A number of predated turtle nests were observed at many other locations during the survey weekend. Thirteen snake eggs were found in a log buried in the ground at site 5. The eggs were only slightly oval, white and had a rough texture. Two eggs had the following measurements: length 26.92 mm, width 21.77 mm and mass 7.042 g; length 25.82 mm, width 22.28 mm and mass 7.163 g. Table 2 summarizes the species and number of animals found at each survey site. An annotated checklist follows.

Table 2. Summary of the number of animals observed at each site.

Species	1	2	2[a]	2[b]	3	4	4[a]	4[b]	5
Amphibians									
Acris crepitans	20	10, C	C	C	16	7, C			
Ambystoma opacum	1				1				
Anaxyrus fowleri	3	4			1	1	8		1
Gastrophryne carolinensis					1		2, C		
Hyla chrysoscelis		E	C	C	3,E	C	C	C	C
Hyla cinerea			C	9, C			C	C	
Lithobates catesbeianus		1, C	C	1, C		C			
Lithobates clamitans	1	8, C	C	2	3	C	2, C	C	
Lithobates sphenocephalus utricularius				1			1		

Lithobates virgatipes		C	C	C	1, 2T	1, C	C	C	
Notophthalmus v. viridescens	3				4				
Plethodon cylindraceus					1				
Pseudacris crucifer					4				
Scaphiopus holbrookii				1					
Reptiles									
Aspidoscelis s. sexlineata									23
Carphophis a. amoenus	2				3				
Chelydra serpentina				1		2			
Chrysemys p. picta						3			
Kinosternon s. subrubrum					1				
Pantherophis alleghaniensis	1								
Plestiodon fasciatus	1	1				1			
Sceloporus undulatus						1			1
Terrapene c. carolina	1				1				
Virginia v. valeriae	1								
Total Number of Animals	34	24		15	42	16	13		25

C = calling males observed, E = fresh eggs observed, T = tadpoles

Annotated Checklist

Amphibians

1. *Acris crepitans* (Eastern Cricket Frog)

Cricket frogs were the most common species found during the survey weekend. Fifty-three adults were observed or hand captured with many hundreds heard calling at night. Twenty cricket frogs were observed along a stream, at the edge of vernal pools, and in leaf litter at site 1. The ten cricket frogs found at site 2 were observed along the logging road and along the shore of a man-made canal. During the morning survey of the oxbow at site 2 a continuous chorus of cricket frogs was observed. Sixteen cricket frogs were found by the road, in leaf litter in the mixed pine and deciduous forest and in the woods surrounding the beaver pond and wetlands at site 3. Six cricket frogs were hand captured along the grassy road paralleling the oxbow lake at site 4 on 13 June. Cricket frogs were heard calling from the oxbow lake on the morning of 13 June. Large choruses of

Eastern Cricket Frogs were heard at oxbow lakes on the nights of 11 and 12 June. During these nights cricket frogs were observed calling from the emergent vegetation in the lakes.

2. *Ambystoma opacum* (Marbled Salamander)
One adult Marbled Salamander was found under a log in a deciduous forest at site 1. One juvenile Marbled Salamander was found under a log at site 3.

3. *Anaxyrus fowleri* (Fowler's Toad)
On the night of 11 June, six juvenile, one adult male and one adult female Fowler's Toads were found along the grassy road bordering the southern part of the oxbow lake at site 5. During the survey on 12 June three juvenile Fowler's toads were found in leaf litter in a deciduous forest at site 1 and one juvenile toad was found on a grass covered road at site 3. On 13 June four juvenile toads were found along a grassy road bordering the oxbow lake at site 4 and one adult male, one female and one juvenile Fowler's Toads were found in the recently burned pine forest at site 5.

4. *Gastrophryne carolinensis* (Eastern Narrow-mouthed Toad)
On the night survey of site 5 on 11 June we heard 2-3 calling male narrow-mouthed toads at about six locations at site 5. These sites were small puddles along the road and with a pine forest bordering the southern side of the oxbow lake at this site. Two males were hand captured in a grassy road rut puddle. One Eastern Narrow-mouthed Toad was found on the forest floor at site 3 on 12 June.

5. *Hyla chrysoscelis* (Cope's Gray Treefrog)
Cope's Gray Treefrog eggs were found in road rut puddles and at two sites along a man-made canal at site 2. These eggs were likely deposited on the night of June 11. Three groups of fleshy laid eggs were found in road rut puddles at site 3 on 12 June. One adult male Cope's Gray Treefrog was observed calling in the morning at site 4 on 13 June. Several males were heard calling from a burned out pine forest at site 5. Cope's Gray Treefrogs were heard calling on the nights of 11 and 12 June adjacent to both the northeastern oxbow lake and southern oxbow lake at sites 2 and 5. Males were calling from trees and on the ground around road rut puddles.

6. *Hyla cinerea* (Green Treefrog)
Green Treefrogs were very common at the southern and northeastern oxbow lakes. Many males were heard calling on the nights of 11 and 12 June. Males were found in the short trees and shrubs along the edge of the oxbow lake. Many more males were calling from the emergent vegetation in the oxbow lakes. On the night of 12 June 9 males were hand captured, measured and released along the shore of the southern oxbow lake at site 2.

7. *Lithobates catesbeianus* (American Bullfrog)
One juvenile bullfrog was caught in a minnow trap in a stream going into the artificial canal at site 2. One male bullfrog was observed calling from the artificial canal during the morning survey of site 2 on 12 June. One bullfrog was heard calling from along the oxbow lake at site 4 on the morning

of 13 June. A few bullfrogs were calling from the southern oxbow lake on the nights of 11 and 12 June.

8. *Lithobates clamitans* (Green Frog)
One juvenile green frog was found in a road rut puddle at site 1. Eight juvenile green frogs were observed along an artificial canal, along the logging road and under a log at site 2. Along the oxbow lake at site 2, continuous Green Frog calling was heard during the morning survey on 12 June. Three juvenile Green Frogs were found in road rut puddles at site 3. Twelve Green Frogs were heard calling from around the oxbow lake at site 4 on the morning of June 13. On the nights of 11 and 12 June Green Frogs were calling from the oxbow lakes in the northeast and southern portions of the WMA.

9. *Lithobates sphenocephalus utricularius* (Coastal Plains Leopard Frog)
Two leopard frogs were found during night surveys. One adult was found on a grassy logging road adjacent to the northeastern oxbow lake at site 4 on the night of 11 June. A second small adult was observed on the night of 12 June sitting along a logging road which bordered an artificial canal at site 2.

10. *Lithobates virgatipes* (Carpenter Frog)
On 11 June while setting turtle traps in a beaver pond at site 5 a chorus of Carpenter Frogs was heard. The chorus did not start until we began hammering aluminum poles for the turtle traps. During the morning survey of site 2 on 12 June a few Carpenter Frogs were heard calling from the oxbow lake. At site 3 a young adult Carpenter Frog was found in a small depression pond in the woods adjacent to a beaver pond. This animal measured 41.84 mm SVL and had a mass of 8.149 g. At this same site two Carpenter Frog tadpoles were caught in a minnow trap set in a small stream flowing out of a beaver pond. Two male frogs were calling from the beaver pond at site 3 at around 1500 hours on 12 June. Dozens of Carpenter Frogs were calling from the oxbow lake at site 4 on the morning of 13 June. An adult Carpenter Frog was observed on the bank of a small vernal pool adjacent to the oxbow lake at site 4 on 13 June. Large choruses with continuous and overlapping calling was heard on the night hikes on 11 and 12 June at both the southern and northeastern oxbow lakes.

11. *Notophthalmus v. viridescens* (Red-spotted Newt)
Two efts were found in leaf litter and one eft was found beside a tree in a deciduous forest at site 1. Three efts were found in leaf litter and one under a log at site 5.

12. *Plethodon cylindraceus* (White-spotted Slimy Salamander)
One male White-spotted Slimy Salamander was found under a log in a forest at site 3. This animal had a fully developed mental gland.

13. *Pseudacris crucifer* (Spring Peeper)
Two adult and two metamorph Spring Peepers were found in leaf litter at site 3.

14. *Scaphiopus holbrookii* (Eastern Spadefoot)
One adult female was found on a grassy road adjacent to the southern oxbow lake at site 2.

Reptiles

15. *Aspidoscelis s. sexlineata* (Eastern Six-lined Racerunner)
A total of 23 adult and juvenile Eastern Six-lined Racerunners were observed in the sandy clear area maintained by controlled burns at site 5.

16. *Carphophis a. amoenus* (Eastern Wormsnake)
One adult Wormsnake was found under a log in a deciduous forest at site 1. One juvenile Wormsnake was found dead on the side of the logging road at site 1. Three adult and one juvenile Wormsnakes were found under logs and under bark at site 3.

17. *Chelydra serpentina* (Snapping Turtle)
Two large Snapping Turtles were caught in a baited hoop trap set in the northern oxbow lake at site 4. These traps were set on the night of 11 June. One hatchling snapping turtle was found in a roadside rut puddle at site 2 on the night of 12 June.

18. *Chrysemys p. picta* (Eastern Painted Turtle)
Three adult painted turtles were caught in a baited hoop trap set in the oxbow lake at site 4. One newly hatched painted turtle was found in a road rut puddle at site 4 on 13 June.

19. *Kinosternon s. subrubrum* (Southeastern Mud Turtle)
One adult mud turtle was observed sitting at the bottom of a road rut puddle at site 4 on 11 June. An adult female Southeastern Mud Turtle was found in a road rut puddle at site 3 on 12 June.

20. *Pantherophis alleghaniensis* (Eastern Ratsnake)
One juvenile Ratsnake was found on the side of a beech tree at site 1 on 12 June.

21. *Plestiodon fasciatus* (Common Five-lined Skink)
On 12 June one adult male five-lined skink was found under bark at site 1. This animal had a missing tail and a missing foreleg. On 13 June one female Common Five-lined Skink was found under a log at site 4.

22. *Sceloporus undulatus* (Eastern Fence Lizard)
One Eastern Fence Lizard was observed on a tree by the grassy road at site 4.

23. *Terrapene c. carolina* (Woodland Box Turtle)
On 12 June one male was found in a form in a deciduous forest at site 1. This male had the following measurements: 147.66 mm carapace length and 124.05 mm plastron length. Another male box turtle found in a form at site 3 had the following measurement: 135.58 carapace length.

24. *Virginia v. valeriae* (Eastern Smooth Earthsnake)
One adult Eastern Smooth Earthsnake was found under log at site 1 in a deciduous forest.

Discussion

The fifteenth annual HerpBlitz was held at Mattaponi WMA at the request of Randy Kyner, the manager of the WMA, who desired to determine the effect of controlled burns conducted since a 2012 survey. One

obvious effect of the burns was to create an open area where Eastern Six-lined Racerunners abound. We found 23 including all age classes, whereas Watson (2013) found one. This result may have been due to search effort or weather, however, it is clear the burns maintaining the open area promotes their continued prevalence on the WMA. When burns are made, we would suggest this be done in the winter months when amphibians and reptiles are hibernating underground so that harm from the fire is kept to a minimum.

Both the first (Watson, 2013) and the present survey found few salamanders. Watson had hypothesized this might be due to the timing of the first survey, during the dryer month of June. The present survey was also held during June, but occurred just after a decent rain. The present survey added the Marbled and White-spotted Slimy Salamanders to the Red-spotted Newt, but this is a poor representation of the 13 species of salamanders documented for Caroline County. Salamanders are probably the least mobile of herp groups, having difficulty expanding ranges into new territory, often having to cross roads and agricultural fields. It is likely that salamanders are under-represented due to the past history of land use at the WMA. Most of the area was subjected to agriculture prior to purchase in 2009 and 2021 for the WMA (Dye et al. 2017). Prior to purchase, 560 acres were clearcut. Forests are regrowing, providing suitable habitat for amphibians; but this takes time, and even longer for species to recolonize the area. We would recommend the forests on the WMA be allowed to regrow, and hope the amphibians, particularly salamanders, will find their way back to these lands. Mature forests are necessary if woodland salamanders are to recover their numbers on the WMA. If timbering is done, clearcuts should be avoided and woody debris should be left on the ground to help provide shelter and habitat for salamanders.

A variety of wetlands are required if salamanders are to recover their numbers. Woodland salamanders do not require free-standing water to reproduce, but stream-side and mole salamanders do. A variety of small vernal pools should be created and maintained to promote both salamander and anuran populations. Gray Treefrog and Narrow-mouthed Toads were observed breeding in shallow depressions in WMA roads. The creation of shallow depression ponds would provide a safer habitat for eggs and tadpoles to develop. Periodically digging depressions, one to two feet deep and ten to twenty feet in length, along the edge of forested areas would provide fish-free habitats for species which typically do not breed in permanent waters.

The most notable feature of the WMA are the large oxbow lakes. These are shallow but extensive wetlands covered with emergent vegetation. They provide excellent habitat for American Bullfrogs, Green Frogs, Carpenter Frogs, Eastern Cricket Frogs and Green Treefrogs. These all make heavy use of the habitat and are found in large numbers. The Carpenter Frog in particular is found in these oxbows and beaver ponds. The Carpenter Frog is a Virginia Tier IIIa species, such that the WMA should make it a priority.

The oxbows and beaver ponds should be protected and maintained to promote populations of Carpenter Frogs.

We, like Watson (2013), had poor success in capturing turtles in hoop traps. Watson (2013) hypothesized their poor results might be due to hot, dry summer weather. A number of turtles were observed basking and coming on land to lay eggs, but none were captured in traps. The oxbow lakes are extensive, such that turtles might also be dispersed. The Red-bellied Turtles Watson (2013) saw are herbivorous as adults and possibly not attracted to traps. We captured turtles in only one of our seven hoop traps, and one of our seven crayfish traps. A small stream flowed into the northern oxbow at this location and may have aided in dispersing the scent of the bait farther into the oxbow in this instance, hence the placement of traps may be crucial for success in extensive wetlands.

Combining data from the first (Watson, 2013) and present surveys, 31 different species (12 anurans, 3 salamanders, 6 snakes, 4 lizards and 6 turtles) are now documented for Mattaponi WMA. This is just over half the 59 documented for Caroline County (FWIS Database). The WMA is relatively young (2009) and time will be required for its forests to mature to the point where it is ideal habitat for amphibians, particularly woodland salamanders. Creating and maintaining a variety of wetlands would promote the area for amphibians. The Mattaponi WMA Management Plan (Dye et al., 2017) stated that wetland protection, enhancement and preservation was to remain a continual focus of the Mattaponi WMA. Hopefully the WMA will be developed into a haven for both amphibians and reptiles in the decades to come.

Table 3. Species observed during the present (2021) and previous (Watson, 2013) surveys of Mattaponi WMA.

Species	2012	2021
Amphibians		
Acris crepitans	130	53
Ambystoma opacum		2
Anaxyrus a. americanus	3	
Anaxyrus fowleri	3	18
Gastrophryne carolinensis		3
Hyla chrysoscelis	4	3
Hyla cinerea	5	9
Lithobates catesbeianus	19	2
Lithobates clamitans	86	16

Lithobates sphenocephalus	7	2
Lithobates virgatipes	21	4
Notophthalmus v. viridescens	12	7
Plethodon cylindraceous		1
Pseudacris crucifer	11	4
Scaphiopus holbrookii		1
Reptiles		
Agkistrodon contortrix	1	
Aspidoscelis s. sexlineata	1	23
Carphophis a. amoenus	4	5
Chelydra serpentina		3
Chrysemys p. picta	6	3
Coluber c. constrictor	1	
Kinosternon s. subrubrum	2	1
Pantherophis alleghaniensis	3	1
Plestiodon fasciatus	2	3
Pseudemys rubriventris	2	
Scincella lateralis	1	
Sceloporus undulatus	8	2
Sternotherus odoratus	2	
Storeria dekayi	1	
Terrapene c. carolina	7	2
Virginia v. valeriae		1
Total Number of species	26	24

Literature Cited

Abrams, M.D. 1992. Fire and the development of oak forests. BioScience 42:346-353.

Dye, M., D. Ellinghausen, J. Harris and R. Hughes. 2017. Management Plan for Mattaponi WMA, Caroline County, Virginia 2017 - 2027. Virginia Department of Wildlife Resources.

Fish and Wildlife Information Service Database, Department of Wildlife Resources. http//services.DWR. Virginia.gov/fwis/

Watson, S.H. 2013. VHS annual Herpblitz at Mattaponi wildlife management area, June 22-24, 2012. Catesbeiana 33(2): 37-47.

Acknowledgements

We thank the following people for participating in the survey: Kelly Geer, Todd Georgel, Jason Gibson, Eva Greco, Robert, Rosemary and Dominic Frezza, Garrett Hedspeth, Karl Kratzer, Randy Kyner, Catey Mancini, Diller and Oliver Matthews, David Perry, Ty Smith, Paul Sattler, Evan Spears, Emily and Kory Steele, and Patrick Wamsley. Special thanks goes out to the manager of Mattaponi WMA, Randy Kyner. He provided access to all locations and came out all day Saturday to herp with the group, finding the only *Plethodon cylindraceus* of the survey. We also wanted to thank Todd Georgel and his dog for helping deploy turtle traps on Friday, June 11th. We also thank John Orr for helpful review comments that greatly improved this manuscript.

Crotalis horridus **(Timber Rattlesnake)** VA: Grayson County, on Brush Creek Road 36.7816230, -81.0664529. 14 June 2021. Leslie Keck

County Record: On 14 June 2021 while driving on Brush Creek Road I came upon a road-killed Timber Rattlesnake. The snake had been run over by a vehicle recently when I came across it. The head, face and jaw were crushed. The midsection of the body was also run over. It was definitely dead so I tried to move it out of the road and about 2/3 of the rattle came off in my hand when I pulled on its tail. I didn't take any photos of the snake, but I did photograph the rattle section and submitted it as a voucher for this record (Archive #635). The weather at the time was warm and sunny.

This is the first record of the Timber Rattlesnake for Grayson County (VHS Website) but other southwestern counties with records include Washington, Smyth, Wise and Russell.

Leslie Keck
2240 Calvary Road
Alton, VA

Lampropeltis getula **(Eastern Kingsnake)** VA: City of Alexandria. Ben Brenman Park, thicket on a slope at edge of a park service road ramp and a meadow. GPS coordinates: 38.81129, -77.11399. 27 April 2021. Alex Taylor

County Record: Alex Taylor, the Mid-Atlantic Regional Supervisor for Invasive Plant Control (IPC), and his crew were removing a dense infestation of Callery Pear (*Pyrus calleryana*) and other weeds for the City when he discovered a snake as it was basking. To protect it from crossing the service road, after photographing the snake, he carefully picked it up and released it into a large, nearby meadow. The temperature was 30° C and the sky was sunny.

Several weeks later, a City staffer with knowledge of snakes of the eastern U.S. photo-documented another adult Eastern Kingsnake about 2 miles east of the Ben Brenman Park location just northeast of 2900-A Business Center Drive. These are the first documented reportings of an Eastern Kingsnake for the City of Alexandria. According to the Virginia Herpetological Society, the Eastern Kingsnake is verified for Arlington and Fairfax counties, the City of Alexandria's two neighboring counties. A digital photo of the specimen from Ben Brenman Park was deposited in the VHS Archive (# 623) as a voucher.

Rod Simmons
Natural Resource Manager / Plant Ecologist
Natural Resources Division
Department of Recreation, Parks & Cultural Activities
2900-A Business Center Drive
Alexandria, VA 22314

***Storeria occipitomaculata* (Red-bellied Snake)**. VA: Bland County, Chestnut Ridge on the Appalachian Trail (37°02'27.9"N 81°26'00.4"W). 10 October, 2021. David Choquette.

County Record: Though the red-bellied snake ranges throughout much of the eastern United States, there are significant gaps in observations in southwestern VA. This is the first record of a red-bellied snake for Bland County. Neighboring Giles County has a record of this species, but it has not been observed in the other surrounding counties of Pulaski, Wythe, Smyth, or Tazewell.

This specimen was approximately 7" long. The dorsum was orange-brown with little to no indication of the darker stripes that typically characterize the species. Its head was much darker. The venter was bright red, and its neck had three orange-yellow spots, allowing it to be identified as a red-bellied snake. It was found slithering across the Appalachian Trail, approximately 4.0 km (2.5 miles) south of Chestnut Knob shelter at an altitude of 1200 m. (3600 feet). The surrounding forest was mixed pines and hardwoods. The morning was cool and foggy, but by 1330 h when this observation was made, it was sunny and the temperature was 21°C. The specimen was released after it was photographed. A digital photo was submitted (#629) as a voucher.

David Choquette
Christiansburg, VA

Storeria occipitomaculata **(Red-bellied Snake)** VA: Page County, 2039 Loop Rd Elkton. 19 September 2021. Brittany Knupp.

New County Record: Red-bellied snakes are small secretive snakes typically found under cover objects by day. Their preferred prey are slugs although they may consume other invertebrates on occasion. They have a wide distribution in Virginia, being verified in 58 counties and 4 cities (VHS website). Only the far southwestern portion of the state has few records, although numerous gaps in the distribution do occur. On 19 September 2021, while mowing the grass, I observed a Red-bellied Snake moving through the lawn. Since this snake was out in the middle of the day, about 1300h, perhaps it was disturbed by the vibration of the mower since they are typically nocturnal. The day was clear and sunny. A number of digital photos were taken and sent to the VHS identification page. The snake was identified as a Red-bellied Snake and I was informed there was no previous record for the species in Page County although it is in the neighboring counties of Shenandoah, Rockingham and Madison. Digital photos were submitted as a voucher (#170) for this record.

Brittany Knupp
Elkton, VA

Virginia valeriae **(Smooth Earthsnake)** VA: Louisa County, Louisa County High School. 15 October 2021, Kathy Richardson and students.

County Record: On 15 October 2021, my students and I were on a nature walk/mini bioblitz on the grounds of the Louisa County High School in a hardwood forest near a creek. We noticed a small snake crossing the pathway and a student picked it up for a better look and some photos. A digital photograph was submitted to the VHS herp identification page for a positive identification. We were told the snake was a Smooth Earthsnake, and there was no previous record for Louisa County. There were previous records for the counties to the north, east and south of Louisa. The weather that day was cloudy and cool, but humid. A digital photo was submitted to the VHS as a voucher (Archive #633) of this record.

Kathy Richardson
Louisa County Schools

Chelydra serpentina **(Snapping Turtle)** VA: City of Portsmouth. Spratley St. near Owens Creek, 36.844155 N, -76.316518 W. 23 August 2021. Cristina Foss

City record: On 23 August, 2021, a Snapping Turtle was observed by the side of Spratley Street. The area is suburban in nature, with the fence of a dwelling a few meters away. Owens Creek is a tidal creek with an associated marsh and is a tributary of the Elizabeth River. The turtle was observed at rest and after photographing was left undisturbed. The carapace length estimated to be approximately 25-30 cm but no direct measurement was taken. The skies were partly cloudy, the temperature 22.8 ºC, there had been no precipitation in the previous 12 hours, but thunderstorms previous to that. This is the first recorded sighting of a Snapping Turtle in the City of Portsmouth, despite a state-wide distribution and records in all surrounding cities and counties (Mitchell J.C. and K.K. Reay 1999, Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1,Virginia Department of Game and Inland Fisheries, Richmond, VA 87pp.). This report fills a gap in the distribution records. A digital photograph was submitted to the VHS Digital Archive (# 625) as a voucher.

Cristina and Kevin Foss
1637 Leckie St.
Portsmouth, VA

Pseudemys rubriventris (Northern Red-bellied Cooter). Northumberland County VA 1269 Pumpkin Hill Road, Heathsville VA 22473 (37.87259N/ -7636833W) 18 June 2021. Temple Moore

County record: The Northern Red-bellied Cooter (*Pseudemys Rubriventris*) is found in freshwater lakes, rivers and swamps in the Coastal Plain and Eastern Shore. The species has not been reported in Northumberland County by Mitchell and Reay (1999, Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries, Richmond ,VA) or Mitchell (1994, The Reptiles of Virginia, Smithsonian Institution Press, Washington DC . 352 pp). I have reported this species previously to the Virginia DWR for the Wildlife Mapping program but without a voucher photograph. On June 18th at approximately 0800 h., a mature female was laying eggs in my front yard. The weather was clear, 22ºC (72ºF) degrees with little wind. A digital photo of the specimen was submitted to the VHS archives (# 628). The species has been reported from all surrounding counties (Lancaster, Richmond and Westmoreland) so this observation fills a distribution gap in eastern Virginia.

Temple Moore
Certified Master Naturalist
1269 Pumpkin Hill Road
Heathsville VA 22473

***Trachemys scripta elegans* (Red-eared Slider).** Va: Prince Edward Co., Hampden-Sydney College campus (37°14'30"N, 078°27'51"W). 10 July 2013. Rachel Goodman, Henry Carman, and Paul Mahaffy.

County Record: During the summer of 2021, Rachel Goodman, Henry Carman, and Paul Mahaffy trapped turtles in two ponds located on the Hampden Sydney College property (DWR Permit # 071097). On 8 June 2021, we captured a female Red-eared Slider turtle at "Tadpole Hole" pond in a Promar Collapsible Crab/Shrimp/Crawfish Trap – (36"x 24" 20") that had been baited with chicken livers the previous night before and opened at 6:37 a.m. The turtle measured: 19.9 cm carapace length and 18.6 cm plastron length at midpoint, 9.3 cm at greatest depth of shell, and 1466.5 g.

Red-eared Sliders are not native to Virginia but have been recorded in 33 counties throughout the commonwealth (Virginia Herpetological Society. 2021. Red-eared Slider, *Trachemys scripta elegans*. Downloaded from https://www.virginiaherpetologicalsociety.com/reptiles/turtles/ red-eared-slider/red-eared slider.php on 07 Aug 2021) and will likely occupy the entire state eventually, based on their historic success as an invasive species (Global Invasive Species Database. 2021. Species profile: *Trachemys scripta elegans*. Downloaded from http://www.iucngisd.org /gisd/speciesname/Trachemys+scripta+elegans on 07 Aug 2021). This species has been sighted in Nottoway County, which borders Prince Edward County, but not in any other bordering county. "Tadpole Hole" pond, the Briery Creek Reservoir, and another campus pond were surveyed for turtles in 2010 (Goodman, R.M., Miller, D.L. and Ararso, Y.T., 2013. Prevalence of ranavirus in Virginia turtles as detected by tail-clip sampling versus oral-cloacal swabbing. Northeastern Naturalist 20(2):325-332.), and no Red-eared Sliders were captured or seen at that time. No other Red-eared Sliders were captured during 6 weeks of trapping turtles in the June – July of 2021. A digital photograph was deposited in the VHS Archive (# 631) as a voucher.

Rachel Goodman, Henry Carman, and Paul Mahaffy
Department of Biology
Hampden-Sydney College
Hampden-Sydney, Virginia 23943

Red-eared Slider *(Trachemys scripta elegans)* VA: Smyth County, Saltville Wellfields Recreational Park (36.87342, -81.76721). 27 July 2021. Robert A. Harris and Sherri A. Harris

Introduced Population/County Record: The Red-eared Slider is a semiaquatic turtle and is a subspecies of the pond slider. They are one of the most popular pet turtles throughout the United States. It is native to the Southern United States and Northern Mexico but have become established in other places due to pet releases and has become an invasive species in many areas where it outcompetes native species. The Virginia Department of Wildlife

Resources recently "naturalized" this species into the Commonwealth of Virginia's native species. The Red-eared Slider is on the list of the world's 100 most invasive species that is published by the International Union for the Conservation of Nature (IUCN) (Lowe S., Browne M., Boudjelas S. (2000). 100 of the World's Worst Invasive Alien Species. A Selection from the Global Invasive Species Database. IUCN/SSC Invasive Species Specialist Group (ISSG), Auckland, New Zealand.).

On the morning of the 27 July 2021 at 1031 hrs., during a survey, we found two juvenile Red-eared Sliders located within the Wellfields Recreational Park in Saltville, VA in the northwest corner of Smyth County. They were roughly larger than a fifty-cent piece. This is evidence of a breeding population in this area as they compete with native species, the Eastern Painted Turtles (*Chrysemy picta picta)* and Cumberland Sliders (*Trachemys scripta troostii)* that are known to be in this location, with the possibilities of hybridization with the Cumberland Slider.

This note reports the first documented sightings of the Red-eared Slider in Smyth County (Mitchell, J.C. and K.K. Reay, (1999). Atlas of Amphibians and Reptiles in Virginia, Special Publication No. 1, Virginia Department of Game and Inland Fisheries, Richmond, VA, 77 pp.), (VaFWIS database and Vertnet.org). There are records of the Red-eared Slider in Washington and Tazewell counties bordering Smyth County. We believe this successful breeding population was introduced through anthropogenic means probably due to people releasing pets.

Digital photos have been deposited in the VHS archives (#632) as a voucher.

Robert A. Harris and Sherri A. Harris
417 Columbia Ave
Marion, VA 24354

***Plestiodon anthracinus anthracinus* (Northern Coal Skink).** Virginia: Rockingham County. 38°43'35.5"N 78°59'19.7"W. 24 June 2021. Sarah VonCannon.

Range Extension and Reproduction: The Coal Skink is one of the rarer lizards in Virginia, being reported from only nine counties and one city, primarily in western montane habitats in the central portion of Virginia. On 24 June 2021 a Northern Coal Skink was found under a rock with 6-7 eggs. Mitchell (1994. The Reptiles of Virginia.

Smithsonian Institution Press, Washington DC. 352 pp.) reports only one other record of a Coal Skink laying eggs in Virginia, a female from Augusta County which laid eight eggs on 16 June. This sighting is the second record for *Plestiodon anthracinus anthracinus* in Rockingham County. Furthermore, this observation is the northernmost record in Virginia extending the range approximately 17 km to the northeast. A digital photo was submitted to the VHS Archive as a voucher (# 626).

Sarah VonCannon
High Point, North Carolina

Plestiodon laticeps (Broad-headed Skink)
VA: Isle of Wight County. 15 August 2021.
Curt Lytle.

New County Record: On 15 August 2021 I saw a large lizard and took a digital photograph of it. The photo was sent to the VHS Herp ID Webpage and the lizard was identified as a Broad-headed Skink. The Broad-headed Skink has a scattered distribution throughout Virginia, except for the far southwestern counties. There are many gaps in the recorded distribution largely because of this lizard's highly arboreal habit. It is typically necessary to have the lizard in hand, or have a good close-up photograph of the head to get scale counts to differentiate the Broad-headed Skink from the Common and Southeastern Five-lined Skinks. The Broad-headed Skink is considerably larger than other Virginia Skinks, so size can sometimes be used to identify the lizard, as it was in this case. In Virginia the maximum recorded total length for the Common Five-lined Skink is 188 mm (7.4 in.), 194 mm. (7.6 in.) for the Southeastern Five-lined Skink, and 287 mm. (11.3 in.) for the Broad-headed Skink (Mitchell, J.C. 1994. The Reptiles of Virginia. Smithsonian Institution Press, Washington DC. 352 pp.). After the photo of the skink was taken, a photo of a scale was also taken from the same portion of the ground. John White was able to scale the two photos and align them to obtain a composite photo to show the total length of this lizard to be in excess of 9 inches (229 mm), exceeding the maximum size of any but the Broad-headed Skink. This observation makes the first vouchered record for the Broad-headed Skink in Isle of Wight County. It has been found in the City of Suffolk to the south and Surry County to the north, so this observation fills the gap between these previous records. The composite digital photo was submitted to the VHS Archive as a voucher (# 627).

Curt Lytle

President's Corner

Dear Members of the VHS,

This President's corner is my opportunity to speak directly to you for the first time as President, introduce myself, and outline the next two years. The society recently held elections at our annual fall business meeting over zoom on November 6th, 2021, and welcomed newly elected officials as well as welcomed back officials who continue to serve. After serving as President for two years and Vice President before that for another two years, Travis Anthony will be serving as Past President, an advisory role to current leadership. John Orr was elected Vice President after serving as the chair of our advisory committee for many years. Matt Close will continue to serve as Treasurer of our society. Yohn Sutton, a long-time member, was elected as Secretary. And I, Erin C. Anthony, have the honor to serve as President. After speaking with each elected official about their vision for the society for the next two years and beyond, I strongly believe this group will serve our membership well and work diligently to further the mission of our society.

The appointed positions are currently in flux as I speak to people interested in leading committees and discuss committee goals and purpose. At this time, I will not announce appointed positions.

For those of you who do not know me, I served as Vice President of the Society during 2019-2021 and as Co-Grant Committee Chair the year before that. Prior to my involvement in the VHS, I was a very active member of the Louisiana Amphibian and Reptile Enthusiasts. I have lived in the Southeastern United States my entire life and have had the privilege to call Florida, Tennessee, Louisiana, and Virginia my home. I hold two Bachelors in Biology and Environmental Science from the College of William and Mary and a Masters in Ecology and Evolutionary Biology from Tulane University. Currently, I am a middle school science teacher on the Eastern Shore of Virginia. I have admired the Virginia Herpetological Society greatly for many years, and hope to further its influence within the fields of herpetological conservation, research, and education through membership engagement and committee structure during my term as president.

It is with no small amount of pride that I revisit the history of women leadership in the society. To not mention this would be to discount the challenges women face in the field of STEM and in particular in Herpetology. Our first woman president of the society was Susan Watson in 2007-2009, 50 years into the establishment of the VHS. Her presidential goals of seeing our nonprofit status returned and upkept as well as celebrating the 50th anniversary of the society with special keynote speakers were achieved, and I hope to have the same success with my own goals as the second woman president. Susan continues to serve our executive committee as the Permits Committee Chair, and I have enjoyed the chance to get to know her and seek her guidance on projects. I look forward to leading the society for the next two-year term while promoting diverse leadership and membership.

My goals as president are to increase membership engagement and streamline our administration. Small natural history organizations have fallen out of favor with younger generations as the internet has provided a free form of networking and finding information, making these organizations irrelevant. The reason I joined

the VHS was because I wanted to make an impact and contribute to the conservation of native reptiles and amphibians, but, if I wasn't on the executive committee, I wouldn't feel I was having that impact because I wouldn't know what the VHS does. To be effective at our mission statement and engage with members, we need organization, transparency, and collaboration. It is my hope to continue the very important work of the society while also ensuring that the society exists for another 63 years.

This work began during my term as Vice President. We created a bylaws committee that continues to revise the society's bylaws to reflect modern functioning of the executive committee and rephrase language to be able to adapt to any future technological advancements. These revisions will be presented to the whole of the executive committee, hopefully soon, and then sent to membership for voting to accept or reject suggested changes. Bylaws are the bones of any organization, and we hope these revisions will allow the skeleton of our society to stand strong against any future obstacles we cannot yet foresee as well as provide clear guidelines to future elected officials.

Membership engagement is perhaps the easiest and most logistically challenging goal I have as president. When I chat with people on surveys there is a trend of wanting to engage more with the society. People go on the surveys and attend the fall conference, but we are essentially silent to the general membership outside of these events. I hope to establish google groups for select committees, and allow members to sign up for committees of their choosing. This was inspired by the Virginia chapter of The Wildlife Society of which I am a general member but still involved in the society's activities outside of field excursions thanks to the committees I signed up for. This is a model I want to emulate for the Virginia Herpetological Society as we have a very active executive board but members aren't apart of our decision making. In the couple weeks that I have been President, I have been calling committee chairs to discuss their vision of the society, their committee goals and descriptions, and determine if they are able to host google groups for their committees. Clear, concise direction, understanding technological challenges, and the ability to positively redirect team leaders are key traits for the coordinator of such an undertaking, and I know I can bring them into my role as President.

My expertise as an ecologist and knowledge of field herpetology are secondary assets when it comes to leading this organization. I understand that true leadership comes from being empathetic, having excellent communication skills, considering logistical problems from every possible angle, and, most importantly, being self-aware of not only successes but also mistakes. Communication, trust, and a shared vision are key to the success of a volunteer organization. We are all here because we want to protect the native reptiles and amphibians of Virginia, and I am very excited to lead such a great organization full of dedicated people.

Sincerely,
Erin C. Anthony
VHS President

Virginia Herpetological Society
Virtual Fall Business Meeting
6 November 2021
Minutes of Meeting

Travis Anthony, President of the Virginia Herpetological Society (VHS), opened the meeting at approximately15:30 h. EDT and provided the agenda for the meeting. VHS and Executive Committee Members (Ex-Com) Erin Anthony, Mark Bonano, Michael Carr, Teresa Chapman, Mike Clifford, Matt Close, Bill Crisp, Steven Custis, Kelly Geer, Bob Gor, Bonnie Keller, Mark Khosravi, Jessica Leslie, Matt Neff, John Orr, Dave Perry, Paul Sattler, Caroline Seitz, Evan Spencer, Katelyn Sullivan, Yohn Sutton, Meagan Thomas, David Van Gelder, Susan Watson and John White also attended all or part of the meeting.

Officer Nominations and Elections

Travis Anthony verbally reviewed the VHS By-laws as currently written for the procedures to be used for the nomination and election of officers. The nominating committee for this election cycle was Travis Anthony and Dave Perry, VHS Secretary. Travis then nominated candidates for each elective office.

President

Erin Anthony was nominated and elected VHS President.

Vice President

Prior to the meeting two candidates were nominated by Travis Anthony for VHS Vice President: Chris Asquith and Michael Carr. At the meeting, Paul Sattler, VHS Journal Editor, nominated a third candidate, VHS Advisory Board Member John Orr. Paul Sattler indicated that he had previous email communication with John Orr, who indicated he was very interested in the position. Paul indicated he is nominating a long-term member who would continue a historical connection to the past. At this point John Orr was able to join the meeting while Chris Asquith was unable to attend. Both Michael Carr and John Orr verbally made their case for election. After a very close vote, John Orr was elected VHS Vice President. Dave Perry thanked the candidates and suggested that there would be many other ways Chris and Michael could contribute to the VHS.

Treasurer

Matt Close was nominated and elected VHS Treasurer.

Secretary

Yohn Sutton was nominated and elected VHS Secretary. Travis indicated that Yohn is also interested in Conservation Committee Chair and also recommended Yohn for the position.

Committee Reports

1. Secretary/Conservation

Dave Perry, outgoing VHS Secretary and Conservation Committee Chair, reported he has some VHS material, mainly for the set-up of in-person business meetings, to transfer to Yohn Sutton at a mutually convenient time within the next few weeks. He also has two containers of back issues of Catesbeiana that Travis Anthony has agreed to take and archive or redistribute. Dave also has some field sticks, disinfection chemicals and equipment to transfer to the Conservation Committee Chair. He suggested that the Conservation Committee might consider False Cape State Park and/or Back Bay National Wildlife Refuge for a survey. VHS surveyed these locations in 2013 but surveying was hampered by wind, cold and rain. Both locations indicated theVHS would be welcome back to survey in more favorable

conditions. Yohn Sutton indicated he knows the new park manager.

2. Journal

Paul Sattler, VHS editor, mentioned there are two articles to be published in the next issue of Catesbeiana which he hopes to publish by the end of the month i.e., the Mattaponi Survey Results and Wally Smith's article "Salamanders on Reclaimed Mine Areas". Paul will need the President's Corner report from Erin Anthony and the final Treasurers Report within the next 2-3 weeks and expects to publish the fall edition in the next few weeks. He anticipates the 2021 VHS Spring Survey and Ferrum College Survey Results to be completed in time for the Spring 2022 edition of Catesbeiana. He thinks the 2022 survey results will be completed in time for the Fall 2022 and Spring 2023 editions.

3. Education

Mike Clifford, VHS Education Committee Chair, sent the Education Committee Report to the Executive Committee (Ex-Com) prior to the meeting. Some of the highlights in this report include guest speaker details from the VHS Virtual Fall Symposium and results of the VHS Animal Identification Team. There were about 800 herp ID requests since the last Fall meeting and several new locality records were recorded. Mark Khosravi, VHS Advisory Committee member, taught an online Level 1National Wildlife Control Operators Association (NWCOA) Certified Reptile and Amphibian course and taught a Level 2 venomous snake training safety course to the WCOs for Prince William County Animal Control. Mike Clifford, Meagan Thomas, Travis Anthony, Larry Mendoza, Susan Watson and Temple Moore provided educational programs to a variety of groups and organization including local Master Naturalist Chapters, botanical gardens, conservation alliances, youth groups, students and state park personnel. Erin Anthony spent a week consulting with National Geographic for educational films (not just herps) for both National Geographic and Disney. Bill Crisp, Bonnie Keller and Robyn Mallard represented VHS at a tabling event at the Remington Fall Festival. John White created original content for the VHS Facebook page including imagery provided for publications which includes VHS in the credit line such as several video clips for the Virginia Department of Wildlife Resources, Range Maps for the article "Snakes of the United States" and several others. This year 291 files consisting of infographics, photos and text were added to the VHS website. In 2021 the VHS Facebook page has reached 140,081 contacts.

4. Permits

Susan Watson, VHS Permits Chair, reported that the Exhibitor Permit is nearly ready, waiting for veterinarian signature. Susan will follow-up with the veterinarian next week. The Scientific Collection Permit will expire at the end of January and will be renewed for an additional two years once the 2022 spring field survey schedule is set (usually by March). The Scientific Collection Permit can be amended thereafter to include additional surveys. Susan reminded the meeting participants that she needs the 2021 survey data, either data sheets or draft/final survey reports, form from the 2021 survey leaders for her year-end report.

5. Surveys

Jason Gibson, VHS Surveys Chair, was unable to attend the meeting but informed Paul Sattler that the most likely survey site for the 2022 HerpBlitz was requested by and will be the Norfolk Botanical Garden (NBG), which is private land in the city of Norfolk. Paul indicated that this survey should be interesting there is not much public land to survey within the city of Norfolk. Paul inquired whether there was any info about a

new state forest in Charlotte County. Susan Watson indicated that she had seen the announcement but had no additional information. Paul indicated this would be the first public land in Charlotte County and could be a potential future survey site.

6. Website
John White, VHS Webmaster, reported that new content continues be added to the website every couple of days. Travis Anthony thanked John and Bonnie Keller for posting the Google survey form.

7. Outreach
Yona Britto, VHS Outreach Committee Chair, was unable to attend the meeting.

8. Regulatory Affairs
Larry Mendoza, VHS Regulatory Affairs Chair, was unable to attend the meeting.

9. Grants
Kory Steele, VHS Grants Committee Chair, was unable to attend the meeting but requested assistance from the Ex-Com to help him update his university professors contact listing to help increase potential VHS research grant requests.

10. Newsletter
Bonnie Keller, VHS Newsletter Editor, reported she is resigning. Bonnie is disappointed that she missed the fall publication date again, due to time constraints, which she believes is unacceptable. Travis Anthony thanked Bonnie for her past contributions and indicated that Yona Britto expressed interest in the Newsletter Editor position. Travis Anthony indicated that Yona Britto has a lot of print/educational material and a lot of experience with formatting and creating things like the Newsletter. Bonnie agreed that Yona would be a good candidate.

11. Merchandise
Maggie McCartney, VHS Online Store Manager, was unable to attend the meeting.

12. Advisory Committee
Mark Khosravi, VHS Advisory Committee Member, reported that he continues to spend significant time with nuisance animal removal activities and continues to be involved with Facebook, email and telephone herp ID requests as well as a lot of public engagement. Meagan Thomas, VHS Advisory Committee Member, has spent significant time working with the VHS By-laws Committee. She is also developing a citizen science project around developing with the GIS folks a smart phone app for mapping Northern Diamond-backed Terrapins. The program will entail loop kayaking by volunteers to conduct headcounts of observed terrapins. Meagan will be doing a lot of outreach and promotion to potential volunteers in coastal Virginia areas as well as others who have an interest in the species and welcomed the assistance of any Ex-Com members.

13. Treasurer
Matt Close, VHS Treasurer, presented a draft Treasurer Report. The bottom line is the VHS current available balance is $27,436.13, which is a record amount. Since the last Treasurer's Report (June 23, 2021) revenues from dues ($2,833.40), donations ($750), Amazon Smile ($111.56) and Café Press ($31.42) far exceeded expenses of PayPal Fees ($135.71), awards ($114.78) and postage ($28.97). Postage expenses are the result of Matt mailing cards to new members and Paul Sattler mailing Catesbeiana. The awards expense is due solely to the Membership of the Year Award. Matt does not expect many more expenses for the balance of the year, except for permit application fees. VHS membership now totals 471, also a record. Matt requested

prompt submission of all fees associated with the Fall Business Meeting. Paul Sattler mentioned the dues line should be adjusted to the gross amount (include PayPal fees) and Matt agreed to make the adjustment. Paul also suggested that postage expense should not change much as the VHS only mails Catesbeiana to institutions and museums and not to individual members. Dave Perry suggested that VHS needs to find more productive projects to fund. Matt Close developed a graph that illustrated VHS net balance for the years 2016-2021. He suggested that balance has grown primarily due to a reduction of VHS expenses. He mentioned that in the past VHS has made large donations to VDWR and others. Matt mentioned some other large expenses in the past were for equipment (turtle traps), lunches for the annual fall meeting and tabletop improvements. The year 2019 was one of high expenses. In the past, VHS also spent some significant funds to upgrade Larry Mendoza's snake cases used in various VHS tabling events. In some years there were two to three $500 research grants whereas there was only one research grant in 2021. Perhaps VHS should consider raising the grant award amounts? Susan Watson reminded everyone that J.D. Kleopfer of VDWR requested a VHS donation of $5000 in 2022 to help fund a new "Turtles of Virginia" guidebook. In return VDWR would donate 500 copies to VHS to sell or distribute at VHS discretion. Susan indicated this request was favorably received by several Ex-Com members although it will require a formal Ex-Com vote. Bonnie Keller suggested that VHS should probably routinely budget for exhibit hardware and materials as these items seem to have a limited shelf life. Paul Sattler mentioned that the Snake/Field sticks he brings to surveys wear out over time (about 3 years) and will need to be replaced. In any case having more of these items will be helpful. Bonnie Keller and others concurred and suggested a regional distribution of snake/field sticks. Bonnie would like to maintain an inventory in northern Virginia. Mike Clifford asked if the large VHS Current Balance will create any problems with the IRS. Matt Close indicated that VHS should not have a problem as there are no paid positions and the only funds paid out to VHS members were for direct expense re-imbursements or excessive travel (over 100 miles) in some cases. Travis Anthony suggested that the VHS form a planning group to develop an inventory of supplies, reach out to members of the Ex-Com to determine their needs, make an annual budget recommendation and some ideas for projects to fund and present their recommendations to the Ex- Com for approval. Meagan Thomas mentioned that VDWR still had many copies of "The Reptiles of Virginia" to mail out to Master Naturalist Chapters among others and asked if it would be possible to spend some VHS funds for stickers for the books. Mike Clifford suggested it was more important to expedite the mailing as several Master Naturalist Chapters had inquired about the status of the books they were promised. Kelly Geer is participating in the Arlington chapter of Master Naturalists and agreed that providing each chapter with the books is a great idea. She sees a lot of interest from this group when she provides information about the activities of VHS. Meagan Thomas has the mailing list and will send one copy to each chapter. Paul Sattler asked if VHS should acknowledge VDWR with the mailing and Meagan Thomas explained VDWR has donated these books to the VHS as Meagan was able to save these from being tossed out. Mike Clifford suggested the VHS will need to pay for the postage. Meagan Thomas agreed to mail out the books, with an acknowledgement to VHS, as soon as possible.

New Business/Discussion

1. **Committee Openings**
Travis Anthony described the status of Committee openings, With Bonnie Keller's resignation, the VHS Newsletter Editor position is now open. Travis indicated that Yona Britto had expressed an interest in the Newsletter Editor position. If Yona is appointed Newsletter Editor, the Outreach Committee Chair would be open. Bonnie indicated she would be interested in the Outreach Committee Chair, as her time constraints might more align with this committee. The new president, Erin Anthony, will appoint the committee chairs. The Outreach Committee would also appeal to Kelly Geer, who has strong data base management skills. Travis mentioned that Yohn Sutton had volunteered to take the open Conservation Committee Chair position and he believes that Larry Mendoza is willing to continue with the Regulatory Committee Chair assignment, although he has not confirmed it. Erin Anthony will need to reach out to Maggie McCartney to determine if she is willing to continue as Merchandise Chair. Bonnie Keller indicated that she has not had any contact with Maggie concerning the t-shirts she is holding. Bonnie might also be interested in the Merchandise Chair. Dave Perry asked if the Outreach Committee was primarily responsible for contacting new members about their membership status and Travis Anthony confirmed it. New membership acknowledgement has occasionally been a problem as Matt Close and Dave Perry receive emails from several concerned new members each year complaining that they have not received any confirmation of their membership status (despite PayPal receipts). This is any area for improvement. Bonnie Keller suggested that membership cards might be something to invest in. Matt Close suggested VHS consider that new members want to be welcomed into the organization and a membership letter or card accomplish that. This is especially true of gift membership cards parents purchase for their children. Matt Close suggested that a bulk purchase of membership cards and first-class postage could results in welcome/renewal contact program that could be conducted for less than $1.00 per contact. Matt showed an example of the card he sends out with the welcome to VHS letter he sends as an example of what VHS might do. Kelly Geer mentioned Apple Wallet digital stamp gift membership cards as a possibility. She also suggested that perhaps the VHS should provide the option of an electronic or paper membership card. New VHS member Steve Custis suggested a durable membership card, able to withstand outdoor environments, would be desirable. He also suggested the VHS consider charging an extra $5 for those who wanted a membership card. Steve suggested email membership cards could be an option and members could print these out on the paper quality of their choosing (VHS did this in 2014-15). Travis Anthony suggested a planning group be formed to debate and decide on some membership acknowledgement ideas and present these ideas to the Ex-Com for decision and implementation. Kelly Geer suggested that the VHS could merchandise/sell a waterproof case for storage of membership cards, permits and licenses. Steve Custis said he also recently purchased a new membership for his daughter (who has loved snakes from a young age) and was very impressed with the presentations made earlier in the day. He did have one concern. Earlier in the business meeting he heard someone mention a coup and wanted assurance that he is not joining an organization in turmoil. Paul Sattler, who made the coup comment, affirmed he made the statement in jest. Several others confirmed there are no organizational issues within VHS and Paul's comment was natural

banter among longtime friends. Steve seemed pleased and satisfied with the explanation and Bonnie Keller thanked Steve for not being shy as a new member and bringing his concern up.

2. By-laws update

Erin Anthony made a presentation on the status of the proposed new By-laws. The rationale for the new By-laws is that the way VHS is operating is in contradiction with the current By-Laws. For example: The VHS Executive Committee is a lot larger than the By-Laws say it should be, technology has changed the time needed for dissemination of materials to membership, language is different (council vs. committee) and the duties of both elected officers and committees needs to be improved and communicated. To address the development of new By-laws a By-laws Committee (BlC) was formed. The BlC started meeting in November 2020 and met once or twice per month thereafter. The BlC worked off a Google document, made and received comments prior to meetings, set each meeting's agenda and objectives and discussed/debated proposed By-law changes with majority votes for changes from meeting participants. Recent meetings were completely asynchronous. Members of the BlC included Erin Anthony, Mike Clifford, Matt Close, Bonnie Keller, Paul Sattler, Meagan Thomas, Susan Watson and John White. Some of the major changes the BlC are recommending can be summarized as follows: the VHS should reduce the number of single person committees, get more members involved on committees, meet regularly and develop clearly defined goals for committees. Currently the VHS has more people than are needed on the Ex-Com including all elected officers and committee chairs and 5 Advisory Committee members The objective is to increase member engagement and increase VHS impact on commonwealth issues concerning native amphibian and reptile conservation, education, and research and develop fiscal and budget guidelines. All other committees would fall under these standing committees. The BlC recommends five elected officer position, President, Vice President, Past President, Secretary and Treasurer and three appointed Standing Committee Chairs: Conservation, Education, Research. The BlC also recommends a new article in the By-laws that a budget will be prepared by the Treasurer each year for approval by the Ex-Com. In addition, the President will have authority to approve purchases under $500 and purchases above will need the approval of the Ex-Com. The next steps include a final review meeting by the BlC whereupon the final proposal will be sent to the Ex-Com for review. If approved, the final By-laws proposal will be sent to VHS membership for approval. Travis Anthony thanked the By-Laws Committee for all of their hard work.

3. Ideas and plans for outreach/membership

Dave Perry stated that when he joined the VHS in 2010 there were about 220 members and today there are 471 current members. He suggested the VHS should consider the possibility of developing regional chapters like other organizations such as Master Naturalists and Master Gardeners or perhaps a pilot chapter program. Yohn Sutton endorsed the idea. Matt Close expressed some skepticism that chapters could work for VHS given the disparity in the geographic concentration of VHS membership. For example, Matt suggested that southwest Virginia would probably have insufficient membership to support a regional chapter. He also was concerned that there are not sufficient active members, for example for the meeting today VHS initially attracted 70 participants which dropped to about 50 at the end of the meeting and is not sure whether

chapters would improve participation or not. Matt Neff pointed out that the VHS already conducts some regional surveys, but he and Meagan Thomas liked the idea of a regional contact for members. Erin Anthony suggested that the real issue is communication. Susan Watson mentioned that in the past the VHS rotated the annual meeting to different regions. Matt Neff and Kelly Geer described the difficulty in traveling to some VHS surveys. Each felt there could be more participation for local surveys. Perhaps half-day surveys. Paul Sattler and Matt Neff pointed out that the VHS tries to rotate surveys to various areas of Virginia to encourage membership participation. Meagan Thomas suggested that new committees might include local leaders to help membership involvement. Matt Close likes the idea of a regional contact and suggested that the VHS should consider dividing the spring survey among several locations in various regions. Erin Anthony reminded everyone that we do have a business meeting with the spring survey and it might be difficult to involve multiple sites. Dave Perry suggested that the idea is not to eliminate the central VHS organization or the spring or autumn meeting but to supplement them with regional chapters. This idea might be further discussed in the future. Erin Anthony requested some guidance on the near-term responsibilities of the VHS President. Travis Anthony said the President's Corner for Catesbeiana, committee chair appointments and email changes were the most immediate needs. Erin Anthony asked for guidance on the email changes. John White stated that Kory Steele would make the gmail changes and he would make the vaherpsociety changes. Mike Clifford would like to see a section on the VHS website where a small biography of officer and committee chair background and experience are posted. Kelly Geer suggested the VHS should change its website from .com to .org. Kelly championed this change for several years and spent her personal funds to maintain the address, but was unsuccessful in getting the change. She assumes the .org address is still available. Matt Close indicated that if it is a domain change, it should be easy and inexpensive to obtain. The advantages of VAHerpsociety.org is that it would clearly indicate that VHS is a not-for-profit organization. Yohn Sutton indicated that other non-profits he is involved with prefer.org as it stops commercial adds. John White indicated that it would be easy to implement this change. Erin Anthony asked how much time she has to appoint committee chairs. Travis Anthony indicated she should try to fill these as soon as possible. Some such as Outreach are important to fill quickly but if there are no candidates, she needs to take the time needed to identify qualified candidates. Erin indicated there are a lot of committee chairs to appoint including Outreach, Newsletter, Conservation, Research and possibly Merchandise.

There being no other business to discuss, Travis Anthony adjourned the meeting at approximately 17:14 h.

Dave Perry & Yohn Sutton
VHS Secretaries

Virginia Herpetological Society
Treasurer's Report
December 02, 2021

Previous Balance-June 23, 2021	$	23,989.21
Gross Receipts		
Dues	$	3247.25
Donations	$	785.00
Amazon Smile	$	247.98
Café Press	$	31.42
Expenses (06/24/2021-12/2/2021)		
Postage	$	28.97
Awards (Member of Year, Photo Contest)	$	264.78
VA DWR Permit Renewal	$	50.00
Web Domains and Hosting	$	383.70
Banking/Service Fees (Paypal, etc.)	$	155.56
Current Gross Balance	$	27,861.65
Total Encumbered (checks issued)	$	443.80
Current Available Balance	$	27,417.85

VHS Memberships (dues current)

Regular:	373
Student:	10
Lifetime:	88
Total	**471**

Matthew Close
VHS Treasurer

Field Notes

The Field Notes section of *Catesbeiana* provides a means for publishing natural history information on Virginia's amphibians and reptiles that does not lend itself to full-length articles. Observations on geographic distribution, ecology, reproduction, phenology, behavior, and other topics are welcomed. Field Notes will usually concern a single species. The format of the reports is: scientific name (followed by common name in parentheses), state abbreviation (VA), county and location, date(s) of observation, observer(s), data and observations. The name(s) and address(es) of the author(s) should appear one line below the report. Consult the editor if your information does not readily fit this format. **All Field Notes must include a brief statement explaining the significance of the record** (e.g., new county record) **or observation** (e.g., unusual or rarely observed behavior, extremely early or late seasonal record, abnormal coloration, etc.). Submissions that fail to include this information are subject to rejection. Relevant literature should be cited in the body of the text (see Field Notes in this issue for proper format). All submissions will be reviewed by the editor (and one other person if deemed necessary) and revised as needed pending consultation with the author(s).

If the Field Notecontains information on a **new county (or state) record**, **verification is required in the form of a voucher specimen** deposited in a permanent museum (e.g., Virginia Museum of Natural History) or a **photograph** (print, slide, or digital image) **or recording** (cassette tape or digital recording of anuran calls) deposited in the archives of the Virginia Herpetological Society. Photographs and recordings should be sent to the editor for verification and archiving purposes; the identity of voucher specimens must be confirmed by a museum curator or other qualified person. Include the specimen number if it has been catalogued. Prospective authors of distribution reports should consult Mitchell and Reay (1999. *Atlas of Amphibians and Reptiles in Virginia*), Mitchell (1994. *The Reptiles of Virginia*), and Tobey (1985. *Virginia's Amphibians and Reptiles: A Distributional Survey*) **[both atlases are available on-line on the VHS website]** as well as other recent literature to determine if they may have a new county record. New distribution records from large cities that formerly constituted counties (Chesapeake, Hampton, Newport News, Suffolk, and Virginia Beach) are acceptable, but records from smaller cities located within the boundaries of an adjoining county will only be published if the species has not been recorded from that county. Species identification for observational records (e.g., behavior) should be verified by a second person whenever possible.

PHOTOGRAPHS

High contrast photographs (prints, slides, or digital images) of amphibians and reptiles will be considered for publication if they are of good quality and are relevant to an accompanying article or field note. Digital images are preferred. Prints should be on glossy paper and no larger than 5 x 7 inches. Published photographs will be deposited in the Virginia Herpetological Society archives.

Paul Sattler and Matthew Becker Coeditors
Department of Biology
Liberty University
MSC Box 710155
1971 University Blvd.
Lynchburg, Virginia 24515